DOCUMENT RESUME

ED 445 457 EC 308 063

AUTHOR	Fichten, Catherine S.; Barile, Maria
TITLE	Access to College for All: ITAC Project--Computer and Adaptive Computer Technologies in the Cegeps for Students with Disabilities = L'accessibilite au cegep pour tous: Projet ITAC--informatique et technologies adaptees dans les cegeps pour les etudiants handicapes.
INSTITUTION	Dawson Coll., Montreal (Quebec).
ISBN	ISBN-155-016-837-1
PUB DATE	2000-00-00
NOTE	322p.; Co-author is Chantal Robillard. Collaborators are Myrtis E. Fossey, Jennison V. Asuncion, Christian Genereux, Darlene Judd, and Jean-Pierre Guimont. Funded by Programme d'aide a la recherche sur l'enseignement et l'apprentissage (PAREA).
AVAILABLE FROM	Project Adaptech, Dawson College, 3040 Sherbrooke West Montreal, Quebec, H32 1A4 Canada.
PUB TYPE	Guides - Non-Classroom (055) -- Reports - Research (143)
LANGUAGE	English, French
EDRS PRICE	MF01/PC13 Plus Postage.
DESCRIPTORS	*Accessibility (for Disabled); *Assistive Devices (for Disabled); Campuses; College Students; Computer Uses in Education; *Computers; *Disabilities; *Economic Factors; Educational Technology; Foreign Countries; Higher Education; Knowledge Level
IDENTIFIERS	Quebec

ABSTRACT

This report discusses outcomes of three empirical studies which investigated the computer and adaptive computer technology needs and concerns of Quebec college students with various disabilities, professors, and individuals responsible for providing services to students with disabilities. Key findings are highlighted and recommendations are made to guide decision making to ensure access to college for all students. Findings include: (1) students with disabilities are generally enrolled in arts and social science programs where computer use is not extensive; (2) most colleges have some type of computer or adaptive computer technologies for students with disabilities on campus; (3) individuals responsible for providing services to students with disabilities are rarely consulted when campus-wide computer and information technology infrastructure decisions are made; (4) many service providers are unfamiliar with adaptive computer technologies; and (5) factors important to the adequacy of an institution in meeting computer needs of students with disabilities include funding, access to adaptive computer technologies, Internet access, technical support, factors related to faculty, and expertise of service provider. The high cost of acquiring and maintaining computer technologies was the single most important and common issue noted by participants. Information is also presented in French. (Contains approximately 400 references.) (CR)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 445 457

L'accessibilité au cégep pour tous:
Projet ITAC - informatique et technologies adaptées dans les cégeps pour les étudiants handicapés

Access To College For All:
ITAC Project - Computer And Adaptive Computer Technologies in the Cegeps For Students With Disabilities

COLLÈGE
DAWSON
PROJET ADAPTECH

Rapport final présenté au PAREA
Final Report Presented to PAREA
Printemps / Spring 2000

Auteures / *Authors*
Catherine S. Fichten, Ph.D.
Maria Barile, M.S.W.

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
✓ This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.
● Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

Coauteure / *Coauthor*
Chantal Robillard, M.A.

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY
Fichten
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

Collaboratrices et collaborateurs / *Collaborators*

Chantal Robillard, M.A.
Myrtis E. Fossey, B. A.
Jennison V. Asuncion, B.A.
Christian Généreux, D.E.C.
Darlene Judd, D.E.C.
Jean-Pierre Guimont, M.Ed.

EC 308063

BEST COPY AVAILABLE

La présente recherche a été subventionnée par le ministère de l'Éducation dans le cadre du Programme d'aide à la recherche sur l'enseignement et l'apprentissage (PAREA). Le contenu du présent rapport n'engage que la responsabilité des auteures.

L'accessibilité au cégep pour tous:
Projet ITAC - informatique et technologies adaptées dans les cégeps pour les étudiants handicapés

Access To College For All:
ITAC Project - Computer and Adaptive Computer Technologies in the Cegeps For Students With Disabilities

Auteures / *Authors*

Catherine S. Fichten, Ph.D.
Maria Barile, M.S.W.

Coauteure / *Coauthor*

Chantal Robillard, M.A.

Collaboratrices et collaborateurs / *Collaborators*

Myrtis E. Fossey, B.A.
Jennison V. Asuncion, B.A.
Christian Généreux, D.E.C.
Darlene Judd, D.E.C.
Jean-Pierre Guimont, M.Ed.

Projet Adaptech / *Adaptech Project*
Collège Dawson / *Dawson College*
Montréal, Québec, Canada
http://omega.dawsoncollege.qc.ca/adaptech.htm

Printemps / *Spring* 2000
Dépôt légal - Bibliothèque nationale du Québec, 2000
Dépôt légal - Bibliothèque nationale du Canada, 2000
ISBN 155-016-837-1

TABLE OF CONTENTS

TABLE OF CONTENTS 2

ACKNOWLEGEMENTS 9

EXECUTIVE SUMMARY 11

- OBJECTIVES 11
- METHODOLOGY 12
- HIGHLIGHTS OF THE FINDINGS 13
  - *How computers are used in the cegeps* 13
  - *Students with disabilities in the cegeps* 14
  - *Computer use by students with disabilities* 14
  - *Computer related services for students with disabilities* 15
  - *Computers for off campus use* 15
- CONCLUSIONS 16
- CONTACT INFORMATION 18

RÉSUMÉ DU PROJET 19

- OBJECTIFS 19
- MÉTHODOLOGIE 21
- CONCLUSIONS MAJEURES 21
  - *L'utilisation des ordinateurs dans les cégeps* 21
  - *Les étudiants de cégeps ayant des incapacités* 22
  - *L'utilisation des ordinateurs par les étudiants ayant des incapacités* 23
  - *Le support informatique offert aux étudiants ayant des incapacités* 23
  - *L'utilisation hors campus des ordinateurs* 24
- CONCLUSIONS 24
- INFORMATION POUR NOUS REJOINDRE 26

INTRODUCTION 27

- PREAMBLE 27
- OBJECTIVES 27
- BACKGROUND 27
  - *Computer, Learning, And Adaptive Computer Technologies In Postsecondary Education* 28
    - Students and their professors 29
    - Personnel responsible for providing services to students with disabilities 29
  - *Postsecondary Education For People With Disabilities* 30
  - *Students With Disabilities in Québec* 31
    - Language issues 31
    - Persons with disabilities 33
    - Accessibility and computer and adaptive computer technologies in the cegeps 33
  - *Universal Access and the Use Of Computer, Information And Adaptive Technologies* 34
    - The digital divide 34
    - Barrier free design 34
    - Inaccessibility of computer technologies 34
- CONCEPTUAL FRAMEWORK 35
  - *Processus de production du handicap / Disability Creation Process (PPH) Model* 35
    - Situation d(e) handicap 35
    - Environmental obstacles and facilitators 36
    - "Habitude de vie" (daily activities) and full participation 36
    - Definitions of impairment and disability 36
  - *Social Model Of Disabilities* 36

  - *Economic Model Of Disability* 36
- Overview Of the Research 37

PARTNERSHIPS AND LINKS FORGED DURING THE GRANT PERIOD 37

  - *Partnerships* 37
- Adaptech's Online Presence 39
- Key Project Personnel 40
  - *The Research Team* 40
  - *The Advisory Board* 41
- Dissemination 42

THE PRESENT RESEARCH 43

- Overview in Outline Form 43
  - *Study 1 - Focus Groups: Students, Service Providers, Professors* 43
  - *Study 2 - Questionnaire: Students* 43
  - *Study 3 - Interviews: Service Providers* 43

STUDY 1: FOCUS GROUPS - METHOD AND FINDINGS 44

- Overview 44
- Introduction 44
- Questions 44
- Participants 45
    - Students (n = 21) 45
    - Service Providers (n = 25) 45
    - Professors (n = 14) 45
- Procedure 46
- Coding and Categorisation 47
    - Limitations 48
- Results: Study 1 49
- Student Focus Group Data Summary 49
  - *Student Question (1)* 49
  - *Student Question (2)* 52
  - *Student Question (3)* 54
  - *Student Question (4)* 58
  - *Student Question (5)* 61
  - *Student Question (6)* 64
- Service Provider Focus Group Data Summary 68
  - *Service Provider Question (1)* 68
  - *Service Provider Question (2)* 74
  - *Service Provider Question (3)* 78
  - *Service Provider Question (4)* 83
  - *Service Provider Question (5)* 88
  - *Service Provider Question (6)* 91
- Professor Focus Group Data Summary 99
  - *Professor Question (1)* 99
  - *Professor Question (2)* 105
  - *Professor Question (3)* 108
  - *Professor Question (4)* 113
  - *Professor Question (5)* 116
  - *Professor Question (6)* 121
- Discussion: Study 1 126
  - *Conceptual Framework* 126
    - PPH model 126
    - Social model of disabilities 126
    - Economic model of disabilities 126

"Situation de handicap dans la nouvelle société technologique d'éducation:" What Do The Participants Say? 127
  Students' responses 127
  Equipment used 127
  Adaptations 127
  Environmental obstacles and facilitators 127
Defining Daily Activities With Regard To Technologies And Education 127
  Computer technologies on campus 128
  Obstacles and facilitators 128
  Who assists 128
  Where equipment comes from 129
  How well current practice in the cegeps works 129
Learning 129
  Service Providers 129
  Helping students 130
  Comparing how students and service providers learn 130
  Students 131
  Obstacles and facilitators 131
  Potential impact 131
Subsidy Programs: Student Perspectives 132
  Purchasing 132
  Different types of government programs 132
  Obstacles 133
Subsidy Programs: Perspectives Of Individuals Responsible For Providing Services To Cegep Students With Disabilities 134
  Awareness of government subsidy programs 134
  Views about funding, loan and subsidy programs 134
  Obstacles 134
Computers On Campus 135
  Service providers: approaches to assisting students 135
  Acquisition of technologies: funding and loans 135
  More time 136
  Obstacles and facilitators 136
Use Of Computers at the Cegeps 136
  Students 137
  Obstacles and facilitators 137
Students: What Works Well, What Works Poorly, And What Are Possible Solutions 137
  Satisfaction 137
  Dissatisfaction 138
  Inclusion in development and decision making as a facilitator 138
Service Providers: Future Developments in Computer Related Services 138
  Uniformity in loans to students 138
  Keeping up-to-date with equipment and information 139
  Advances in computer and adaptve computer technologies 139
Other Information 139
  Computers as obstacles and facilitators 139
  Attitudes as obstacles 140
  Overcoming old obstacles 140
  Jobs of service providers 141
Equipment Vendors And Suppliers In Québec 141
  Identification of disabilities 141
Use Of Computers By Professsors 142

    Teaching students with disabilities using computer technologies 143
    Future developments in teaching using computer technologies 144
    Availability of resources and training 145
    Evaluation of the system: What works well and what does not 145
    Other concerns about teaching using computer technologies 147
  Conclusions 148
    Shared views 149

STUDY 2: QUESTIONNAIRE STUDY OF STUDENTS - METHOD AND FINDINGS 151

  Overview 151
  Participants 151
  Procedure 152
  Questionnaire 153
   Topics Covered in the Questionnaire 153
  Informed Consent 154
  Participant Recruitment 154
  Enrollment Data 156
  Results: Study 2 156
   Student's Experiences With Computer, Information And Adaptive Technologies 156
    Users and non-users of computers and the internet 156
   Computer and Internet Use and Attitudes Towards Computers 156
    English and French cegeps 156
    Cities versus the "Regions:" French cegeps 157
    Sex differences 157
    Age differences 157
   Equipment For Students With Disabilities 158
   What Kinds Of Equipment Do Students Who Use Computers Actually Use? 159
   Problems With Computers Noted By Students Who Are Computer Users 160
    Problems at school 160
   How Students With Computer And/Or Adaptive Computer Technologies Acquired These 161
   Experiences Of Computer User Students With Provincial Government Programs 161
   Why Students Do Not Use A Computer 162
   Suggestions For Adaptive Computer Hardware And Software Companies 162
  Discussion - Study 2 163
   Sample Characteristics 163
   Limitations And Sampling Issues 163
    Sampling issues 164
   Equipment For Students With Disabilities 164
    Sex and age differences 165
   Computer Users - What Equipment Do They Use And Where Do They Use Them? 165
   Students' Experiences With Computer, Information And Adaptive Technologies 166
    Users and non-users of computers and the internet 166
    The internet 166
   Problems With Computers Noted By Students Who Are Computer Users 166
    Problems at school 167
   How Students With Computer And/Or Adaptive Computer Technologies Acquired These 167
    Experiences of student computer users who took advantageof a government program 167
    Reasons why students did not take advantage of a government program to obtain a computer or adaptive computer technologies 167

STUDY 3: TELEPHONE INTERVIEW - SERVICE PROVIDERS - METHODS AND FINDINGS 168
OVERVIEW 168
PARTICIPANTS 168
PROCEDURE 168
INTERVIEW QUESTIONS 169
RESULTS 171
Enrollment Data 171
Participants 171
AQEHPS 171
"Official" data 171
Proportion Of Students With Disabilities 172
Is The Size Of The Cegep Related To The Percentage Of Students With Disabilities? 173
Is The Language Of The Cegep Related To The Percentage Of Students With Disabilities? 173
Location of cegeps 174
French cegeps: City vs. Regions 174
City cegeps: English vs. French City cegeps 174
Institutions With And Without Computer And Adaptive Computer Technologies On Campus For Students With Disabilities 174
Provincial/regional loan programs 175
"Actual situation" 175
Correlates of Good Institutional Computer and Adaptive Computer Technologies 175
Characteristics Of Individuals Who Provide Disability Related Services To Students 176
Aspects of Computer Technologies at Colleges 176
"Actual situation" 176
Access to adaptive computer technologies 177
Internet/library and adaptive computer technologies 177
Support for adaptive computer technologies 177
Faculty and computer accessibility 177
Outside the institution factors 177
"Desired situation" 177
Wish list of personnel who provide services to students with disabilities 178
DISCUSSION: STUDY 3 178
Presence Of Students With Disabilities on Campus 178
Education system in Québec and the rest of Canada 179
Variables related to the proportion of students with disabilities in the cegeps 180
THE ACTUAL SITUATION OF COMPUTERS ON CEGEP CAMPUSES 181
Meeting The Computer And Adaptive Computer Technology Needs Of Students With Disabilities: Actual And Desired Situations 182

GENERAL DISCUSSION, IMPLICATIONS AND CONCLUSION 184
Limitations Of The Present Research 184
Overall Impressions And Recommendations 184
FINDINGS SUMMARIZED 186
How Computers Are Used In The Cegeps 186
Representation Of Students With Disabilities In The Cegeps 187
Characteristics Of Cegep Students With Disabilities 187
Computer Use By Students With Disabilities 187
Problems With Computers 188
Computer Related Services At Cegeps For Students With Disabilities 188
Computers For Off-Campus Use 189
Computer Technology Used By Students With Disabilities 190
Ensuring Access: How Do Students With Different Disabilities Use Computer Technologies 190

Students who are blind ... 190
Students who have low vision ... 191
Students with hearing impairments ... 191
Students with speech/communication impairments ... 191
Students with mobility and hand/arm impairments ... 191
Students with a learning disability ... 192
Trends in How Computer And/Or Adaptive Computer Technologies Can Be Used By Students ... 192
"Cross use" of computer technologies ... 192
Blurring between adaptive and mainstream technologies ... 193
EQUITY ISSUES ... 194
Universal Design - Barrier Free Access ... 194
Planning for implementation: recommendations for educational and instructional technologists and planners ... 195
ACCESS TO CEGEP FOR ALL ... 196
Ensure Accessibility Of Courses For All Students ... 196

RECOMMENDATIONS FOR PROFESSORS ... 197

PUT COURSE INFORMATION ON THE WEB WELL BEFORE THE BEGINNING OF TERM ... 197
MAKE COURSE MATERIAL AND WEB SITES UNIVERSALLY ACCESSIBLE ... 198
Students who are blind ... 198
Students who have low vision ... 198
Students who have hearing impairments ... 199
Students with learning disabilities ... 199
OTHER USEFUL TIPS ... 199
Make textbooks, course materials, assignments, handouts, etc., available in alternate formats ... 199

RECOMMENDATIONS FOR INDIVIDUALS RESPONSIBLE FOR PROVIDING SERVICES TO CEGEP STUDENTS WITH DISABILITIES ... 200

MAKE TECHNOLOGY FOR STUDENTS WITH DISABILITIES AVAILABLE ON YOUR CAMPUS ... 200
PROVIDE OFF-HOURS ACCESS TO COMPUTER TECHNOLOGIES ... 201
LET STUDENTS WITH DISABILITIES KNOW WHAT IS AVAILABLE TO THEM ON CAMPUS ... 201
EDUCATE PROFESSORS ABOUT THE IMPORTANCE OF ENSURING ACCESSIBILITY IN THEIR COURSES ... 201
MAKE TRAINING A PRIORITY BOTH FOR STUDENTS AND COLLEGE PERSONNEL ... 202
INCLUDE STUDENTS WITH DISABILITIES IN ALL COMPUTER, LEARNING, AND ADAPTIVE COMPUTER TECHNOLOGY ACQUISITION DECISIONS ... 203
VALUE THE OPINIONS OF STUDENTS WITH DISABILITIES ... 203
MAKE ACQUISITION DECISIONS THAT REFLECT THE NEEDS OF ALL STUDENTS WITH DISABILITIES ... 203
BECOME INFORMED AND SHARE INFORMATION ON GOVERNMENT PROGRAMS OFFERING TECHNOLOGY BASED ASSISTANCE FOR STUDENTS WITH DISABILITIES ... 204
MAKE INTERNET ACCESS FOR STUDENTS WITH DISABILITIES A PRIORITY ... 204
TAKE ADVANTAGE OF THE EXPERIENCE OF OTHERS ... 204
GET INVOLVED IN PLANNING BODIES RESPONSIBLE FOR INSTITUTION-WIDE INFORMATION TECHNOLOGY PURCHASES AND SYSTEMS DEVELOPMENT ... 205

RECOMMENDATIONS FOR GOVERNMENT ORGANIZATIONS, MINISTRIES, REHABILITATION AGENCIES AND OTHERS INVOLVED IN FORMULATING POLICIES REGARDING ACCESS TO COMPUTER TECHNOLOGIES IN THE CEGEPS ... 206

MAKE THE CEGEP COMMUNITY MORE AWARE ABOUT THE PROGRAMS AVAILABLE TO THEM AND ABOUT CHANGES TO THESE PROGRAMS AS THEY OCCUR ... 206
CLARIFY AND MAKE TRANSPARENT THE RULES AND CRITERIA FOR ELIGIBILITY ... 206

SIMPLIFY THE APPLICATION PROCESS AND MAKE APPLICATION INFORMATION AND FORMS AVAILABLE IN ALTERNATE FORMATS 206
PROVIDE FLEXIBILITY IN ALL PROGRAMS TO ALLOW FOR UPGRADING AND/OR UPDATING STUDENTS' EQUIPMENT 207
TREAT DIFFERENT IMPAIRMENTS ON EQUAL TERMS 207
DO NOT TAKE PARENTAL INCOME INTO ACCOUNT WHEN ADULT STUDENTS WITH DISABILITIES LIVE WITH THEIR PARENTS 208
SHORTEN WAITING PERIODS AND FUND TRAINING 208

RESOURCES 209

THE NEED FOR COMPUTER-RELATED ACCESSIBILITY RESOURCES IN FRENCH 209
Create a task force on accessibility of the new electronic media 210
Create a French-language clearinghouse of information on the internet 210
Form and electronic discussion group (listserv) on adaptive computer technologies 210
Conduct annual evaluations of services being provided 210
FREE AND INEXPENSIVE TECHNOLOGIES: INCLUDING STUDENTS IN COMPUTER-BASED ACTIVITIES WHEN NO SPECIALIZED ADAPTIVE COMPUTER TECHNOLOGIES ARE AVAILABLE 210
Basic Resources 211
Basic Resources: English 211
Basic Resources: French 211

CONCLUSIONS 212

BIBLIOGRAPHY 214

APPENDIX 234

Figures 235
Tables 239

ACKNOWLEDGEMENTS

This project was funded by PAREA and carried out in partnership with the Association québécoise des étudiants ayant des incapacités au postsecondaire (AQEIPS), the National Educational Association of Disabled Students (NEADS), the Service d'aide à l'intégration des élèves (SAIDE - Cégep du Vieux Montréal), and le Services aux étudiants handicapés du Cégep de Sainte-Foy. We are grateful for the assistance and support and extend our most grateful thanks to our partners.

Many other groups, organizations, funding bodies and, most of all, people, contributed to the successful realization of this project. Indeed, it is difficult to know where to start acknowledging the help and support we have received, and perhaps even more difficult to know where to stop.

First and foremost, we wish to thank all those who participated in the various phases of the research which forms the basis of this report: participants of the focus groups, the personnel responsible for providing services to students with disabilities who assisted us with the distribution of questionnaires and whom we interviewed, and all of the students who responded to our questionnaire. Without them, neither the research nor this report would have been possible. We are grateful for their candid comments and thoughtful responses. Their participation was crucial in benefiting not only those who are currently involved in higher education but, we anticipate, cegep students with disabilities, personnel who provide services to them, and all those working in this area for years to come.

We are also grateful to the members of our active Advisory Board; we thank you most sincerely for feedback, constructive criticism, and valuable suggestions. In particular, we are grateful to Joanne Senécal, Jean-Charles Juhel, Dr. Joan Wolforth, Mario Boulet, and Daniel Fiset who did much to assist and guide us in this project.

We have also had the active and enthusiastic collaboration and support of several cegep student services professionals, including: Bob Boyce, Jeff Grummett, Dr. Alice Havel, André Leblanc, Normand Meunier and Veronica Wynne. Other individuals have given active support to our team by serving on our Advisory Board, sharing their experiences, helping to refine our instruments, or actively participating on our online discussion forum. We would like to thank these countless individuals as well as the many others whose names do not appear here but who have made significant contributions to our research.

We are also indebted to the dedicated members of our research team, which includes a multi-talented group of students, research assistants, and professionals: Iris Alapin, Rhonda Amsel, Jocelyne Cote, Darlene Judd, Rachel Fima, Jason Lavers, Evelyn Reid, Fay Schipper, Charles Stephen, and Raymond Tam. Development of all our instruments, translation, and adaptation into alternate formats, data collection and entry, recruitment of participants, and all other tasks that make a research project run smoothly were placed into the hands of this hard working and dedicated group of team players. We are also grateful to Louise Brassard and to Mike Buonvino as well as to Jacques Cote of Braille Jymico, who provided just-in-time assistance when we most needed it.

We would also like to express our deepest appreciation to everyone at Dawson College where we are based: members of the administration, faculty, computing staff, print shop, mail room and everyone else we are undoubtedly forgetting who fulfilled our requests, as unreasonable as they may have sounded. We are especially grateful to Gary Clemence, Mary Derouin, Bruno Geslain, Dr. Joe Guerriero, Stacey Katz, Drago Kresevic, Dr. Neville Gurudata, Natalie Kurylo-Paiva, Suzanne Prévost, Terry Sinchak, and Dr. Patrick Woodsworth.

Although the main source of financial support for this project was PAREA, specific aspects and activities were supported by grants provided by EvNet, the Social Sciences and Humanities Research Council of Canada

(SSHRC), the Office of Learning Technologies (OLT), Dawson College, the Office des personnes handicapées du Québec, Human Resources Development Canada, and le Comité d'adaptation de la main-d'œuvre pour personnes handicapées.

Finally, as the project evolved, we were fortunate to come into contact with individuals and organizations, in person and online, who provided us with the information, inspiration, and the energy to continue with our work. Serge Brassard and Lucie Lemieux-Brassard's support and input have been especially valuable.

As we noted earlier, it is difficult to know where to stop. We would like to most sincerely thank the people and organisations whom we have named, as well as the many others whose names do not appear on this list but who have made important and substantial contributions to our research.

Access To College For All:
ITAC Project - Computer and adaptive computer Technologies in the Cegeps For Students With Disabilities
Final Report Presented to PAREA

Catherine S. Fichten, Ph.D., Maria Barile, M.S.W., Chantal Robillard, M.A.
With the collaboration of:
Myrtis E. Fossey, B.A., Jennison V. Asuncion, B.A., Christian Généreux, D.E.C.,
Darlene Judd, D.E.C., Jean-Pierre Guimont, M.Ed.
Adaptech Project, Dawson College, Montréal
2000

EXECUTIVE SUMMARY

Abstract

Results of three empirical studies which investigated the computer and adaptive computer technology needs and concerns of the following groups are presented: cegep students with various disabilities, cegep professors, and individuals responsible for providing services to cegep students. Key findings about the current situation in Québec's cegeps are highlighted and recommendations are made to guide decision making to ensure "access to college for all."

Objectives

The overall objective of this research was to provide information needed to ensure that recent advances in computer, learning and adaptive technologies in the delivery of postsecondary education and training reflect the needs and concerns of 3 groups: cegep students with disabilities, the professors who teach them, and the individuals responsible for providing services to cegep students with disabilities.

Our goal was to provide an empirical basis for decision making. In particular, the information we gathered will help inform current practice in the acquisition and administration of computer technologies in the cegeps. We plan to disseminate recommendations based on our findings to help ensure that emerging technologies and innovations in the delivery of postsecondary education are accessible to students with disabilities. In the endeavour to ensure full access to a college education for students with disabilities we are guided by the spirit of, "A part... égale" (OPHQ, 1984), the "1992 Forum" (Dufour, 1992) and the recent evaluations by the OPHQ's "États généraux sur l'éducation" and "État de situation de la thématique des services éducatifs et de la formation continue" (Allie & Hébert, 1998; OPHQ, 1995).

In conducting the research, we wanted to answer the following questions

- What educational and social goals of cegep students are met by computer technologies (e.g., submitting term papers by e-mail, during extremely cold temperatures being able to freely "move" about on the internet for students with limited mobility)?
- What are useless but popular computer technologies? What are shortsighted economies (e.g., use of obsolete equipment by students with disabilities)?
- How do systemic variables interact with individual differences to facilitate or hamper the use of computer technologies (e.g., availability of free internet access for students, provincial programs that provide subsidised computer technologies)?
- What aspects of the technologies do computer user students with various disabilities consider particularly useful (e.g., laptops used by students who are blind, computerised library access)? How are these used (e.g., in class for note taking, from home via a modem)?
- How do professors see the use of computer technologies affecting the nature of teaching at the cegeps, especially as it impacts on students with disabilities?
- What could professors do to improve the electronic accessibility of their courses for students with different types of disabilities?
- What would computer user students, non-users, cegep personnel who provide services to students with disabilities, and professors put on their "wish lists" for an ideal computer mediated teaching and learning environment that is accessible to students with all types of disabilities?
- What are the characteristics of cegeps which meet the computer and adaptive computer technology related needs of their students with disabilities?
- Do regional differences play a role in the availability of computer technologies for students with disabilities?
- Does the number or proportion of students with disabilities in the college affect the availability of computer and adaptive computer technologies on campus?
- Do anglophone and francophone students with disabilities have equal access to computer and adaptive computer technologies?
- How well informed are personnel who provide services to students with disabilities in the cegeps about which computer and adaptive computer technologies might be helpful?
- How well do the current province-wide programs and systems which make computer and adaptive computer technologies available to students and to cegeps meet their needs?

Methodology

This research lasted two years (Fall, 1998 - Spring, 2000). During this time we conducted a series of three studies with the help of our Advisory Board in collaboration with the following organizations.

- l'Association québécoise des étudiants ayant des incapacités au postsecondaire (AQEIPS)
- The National Educational Association of Disabled Students (NEADS)
- The western Québec group of personnel who provide services to cegep students with disabilities: Service d'aide à l'intégration des élèves (SAIDE) at Cégep du Vieux Montréal
- The eastern Québec group of personnel who provide services to cegep students with disabilities: Le Services aux étudiants handicapés du Cégep de Sainte-Foy
- The Canada-wide professional organization of postsecondary personnel providing services to students with disabilities [Canadian Association of Disability Service Providers in Post-Secondary Education (CADSPPE)]

In Study 1, carried out in 1999, we conducted focus groups which included 60 participants: 21 cegep students with different disabilities (9 anglophones and 12 francophones), 25 individuals responsible for providing services to cegep students with disabilities (5 anglophones and 20 francophones), and 14 cegep professors (7 anglophones and 7 francophones). Separate unilingual focus groups were held for each of the 3 categories of participants. Groups were held in Montréal, Québec (Sainte-Foy), and Trois Rivières.

In the same year we also carried out Study 2. Here, 76 college students with disabilities (21 anglophones and 55 francophones) completed a written survey which dealt with a variety of computer related issues.

In Study 3, carried out in 2000, we conducted structured telephone interviews with 46 individuals responsible for providing services to cegep students with disabilities (6 anglophones and 40 francophones) from "public" cegeps from both the eastern and western sectors of Québec. This included 22 cegep service providers from large cities (Montréal, Québec, Hull) and 24 from Québec's outlying regions.

Highlights of the Findings

How computers are used in the cegeps

- While there is substantial interest in using computer technologies in the classroom, progress in this area in the cegeps is only in the initial phases of development
- There is wide variation among professors in the extent of computer use: discrepancies seem to be related to program and discipline, with heavier use in the sciences and engineering technologies than in arts and the social sciences
- When computers are used, the most popular applications are word processing (Word), spreadsheets (Excel), PowerPoint, and the internet, with students being expected to word process assignments and to carry out research using the internet
- Professors indicated that at present the cegeps have limited equipment available both to professors and to students: computer labs are crowded, opportunities to hold classes in computer labs are few, availability of equipment for classroom demonstrations is limited, and classroom demonstrations have multiple technical difficulties
- A common educational use of computers by professors is to put course outlines and course notes on a web page
- Professors are concerned about the cost of upgrading software and hardware in computer labs on a regular basis, given the short usable life of computers - between 3 and 5 years
- Although some professors attempt to use up-to-date instructional design principles when integrating computers into their courses, this is not typical
- Professors are concerned that there is an overemphasis on technology and an underemphasis on pedagogy
- In the next 5 years professors generally see more of the same, except faster, better, and cheaper technologies; there was little mention of interactivity, communities of learners, construction of knowledge, distributed learning, or other current concepts in educational technology
- Some professors noted that pedagogical practices which are useful for students with disabilities are good pedagogical practices in general (e.g., being more organized with lecture notes, spelling names and difficult words when writing these)

Students with disabilities in the cegeps

- In comparison with colleges in the rest of Canada, cegeps have substantially and significantly smaller proportions of students with disabilities (i.e., a 10 fold difference: 1/2% in Québec compared to 5-1/2% in the rest of Canada); this was true of both French and English cegeps, although English cegeps had a slightly larger proportion of students with disabilities than French cegeps
- French cegeps in large cities and cegeps in the regions generally did not differ, but where they did, the differences in computer and internet use and attitudes favored the city cegeps
- There were substantial and significant differences between the number of students actually receiving services in the cegeps and the numbers that were "officially" recognized by the provincial Ministry of Education - three times as many students were actually receiving services compared to the numbers which appeared on the "official" lists that determine funding for the cegeps
- Discrepancies between actual and "official" numbers occurred in both French and English cegeps and cannot be explained by the presence of students with learning disabilities in English cegeps
- There is growing concern expressed by the disability service providers in the cegeps about the need to accommodate the computer related needs of students with learning disabilities; although the need is greater in the English sector, it is increasingly evident in the French sector
- Key problems for both students and cegep service providers include: the high cost of computer technologies; network, hardware and software compatibility problems created by popular adaptive computer technologies; poor training opportunities both for students and service providers; failure to inform professors about topics related to electronic access for students with disabilities in computer courses geared to faculty; inadequate funding and computer support services to meet future needs

Computer use by students with disabilities

- Virtually all students with disabilities in our studies (more than 90%) use computers, mainly IBM compatibles, both at home and at school, an average of 9 hours per week
- The overwhelming majority (more than 80%) of both francophone and anglophone students use the internet, mainly for research and personal e-mail (about 2/3 of students use this at home and 2/3 at school) for an average of 6 hours per week in addition to time spent on a computer
- Almost half of the students had more than 1 impairment
- About 1/3 of students needed adaptations to use a computer effectively (e.g., software that enlarges what is on the screen, adapted mouse), although not all of them used these - the reason: lack of availability and cost
- There was a clear tendency to "cross-use technologies" (i.e., technologies intended for students with one type of disability used by students with a different disability)
- Within the variables investigated, both age and sex were only minimally associated with computer related views and experiences

Computer related services for students with disabilities

- Students with disabilities are generally enrolled in arts and social science programs; computer use in courses in these disciplines is not extensive
- Cegep service providers indicate that, at present, computer related services are only a moderate priority for them
- Most cegeps (more than 3/4) had some type of computer or adaptive computer technologies for students with disabilities on campus
- Service providers report that students often come to school with their own computer equipment, and that most generally need no further computer related services
- Computer related services are not organized systematically - cegeps with fewer students typically proceed on a case by case basis - an approach which many service providers feel meets the current needs of students with disabilities
- Very few cegeps have multidisciplinary computer access committees and individuals responsible for providing services to cegep students with disabilities are rarely consulted when campus-wide computer and information technology infrastructure decisions are made
- When they experience difficulties with students' computer related concerns, professors generally ask either the students themselves or the service providers for assistance
- The provincial computer loan programs which provide computer equipment and information to individual cegeps for on-campus use (run by the SAIDE at Cégep du Vieux Montréal and le Services aux étudiants handicapés du Cégep de Sainte-Foy) received outstanding evaluations from the individuals responsible for providing services to cegep students with disabilities
- Most cegeps do not loan equipment to students for home use
- Both students and service providers expressed concerns about being poorly informed about what technologies are available and about new developments
- Many service providers are unfamiliar with adaptive computer technologies
- Knowledgeable service providers are self-taught: they try it out at home, learn from the students, check out the web, call on each other, etc. - there is no time for courses or conferences
- Some factors which are important to the overall adequacy of an institution in meeting the computer related needs of students with disabilities include: funding, access to adaptive computer technologies, internet access, technical support, factors related to faculty, and expertise of service provider

Computers for off-campus use

- Computers used off campus were primarily purchased by students and their families; less than 1/3 of students used a government program to help them acquire computer technologies for home use
- Individuals responsible for providing services to cegep students with disabilities expressed the need for students with disabilities to be able to get subsidized computer technologies for home use more easily
- Students with disabilities and cegep service providers are both concerned about problems students have upgrading computers they use at home because some government subsidy programs do not provide upgrades

- Although government agencies and programs provided up-to-date equipment, there were serious problems noted with lengthy delays, limited choice, poor provisions for upgrading, inadequate training, restrictive admission criteria, and exclusion of students with certain disabilities as well as of students with "less severe" major functional limitations
- Both students and individuals responsible for providing services to cegep students with disabilities were exceptionally poorly informed about the nature and availability of government and rehabilitation agency programs to assist students with acquiring computer technologies for off-campus use - in particular, students with hearing impairments were not taking advantage of available programs
- Students who had no computer at home wanted to have one; those with no portable equipment wanted this; those who needed adaptations and did not have these wanted adaptations; and students who had no internet access from home wanted access
- The high costs related to acquiring, maintaining, and updating computer technologies were the most important and common issues noted by students (both computer users and non-users), service providers, as well as professors

Conclusions

Results of the three investigations converge on the following: cegep programs which enroll large numbers of students with disabilities (i.e., arts and social sciences) are not yet heavily computerized. Computer related services constitute only a moderate priority for individuals responsible for providing services to cegep students with disabilities. There is, however, increasing use of computer technologies in the cegeps and there is concern over inadequate funding for computer and adaptive computer technologies and computer related services, both for on-campus and off-campus use. Individuals responsible for providing services to cegep students with disabilities wish that students were better equipped for college level computer experiences. In particular, service providers lament the restrictive access to government and rehabilitation agency subsidy programs for students with disabilities. They also noted that the cegeps are providing services to many students whose disabilities are simply not recognized by the government for funding purposes. This is certainly true for students with learning disabilities, both in English and French cegeps, but is also true for students with a large variety of other disabilities (e.g., chronic medical conditions, psychiatric impairments). Another key finding was that although these exist, many students and service providers were simply not aware of available funding programs which could help students acquire computer technologies for off-campus use.

The vast majority of cegep students, regardless of sex, age, location, program of study, or type of disability, can and do use computer technologies in the context of their studies. The number and nature of the advantages that computer technologies had for participants show how critical computers are to the success of students with disabilities.

The high cost of acquiring and maintaining computer technologies was the single most important and common issue noted by all three groups of participants. The majority of students who had computer equipment at home indicated that they or their families had paid for these. Students indicated that they did not take advantage of a government program to help them obtain a computer or adaptive technologies because they did not know these existed. The solution to the problem is obvious: organizations, programs and agencies that provide money, loans or computer technologies to students with disabilities need to do more effective "outreach." More broadly based information dissemination to better inform students (in alternate formats), financial aid officers, and cegep personnel responsible for providing services to students with disabilities about available opportunities is clearly needed.

Since about 1/2 of the students in our sample had two or more impairments/disabilities, the need for adapted work stations which can accommodate the needs of students with various disabilities seems necessary. There was a pronounced trend for students with one kind of disability to use technologies intended for students with a different type of impairment. For example, screen reading software, large screen monitors, and scanners used in conjunction with optical character recognition software are used not only by students with visual impairments but also by students with learning disabilities. Dictation software is used both by students with learning disabilities as well as by students with problems using their hands or arms. Multiple uses of adaptive technologies seems to be an important development, and the increasing number of accessibility features built into widely available mainstream products are of considerable interest to students with disabilities. Nevertheless, recent developments in sophisticated adaptive technologies have underscored the increasing need to ensure that different types of adaptive equipment be able to work together. This is an important issue because there are compatibility problems among various adaptive computer technologies. In particular, the video card requirements of magnification software, the heavy hardware and training demands of dictation programs, and compatibility problems between dictation and screen reading technologies pose difficulties. Compatibility with Windows NT is rapidly becoming a priority.

Computers are technologies that are enabling - that allow students with disabilities to prepare for and to participate in the knowledge-based economy of tomorrow. To plan for the future rather than catch up with the past we recommend that the broadest based consultations take place at cegeps and organizations and agencies which provide equipment and training for students with disabilities. Such consultations must involve students, who, of course, are ultimately the end-users. The complexity of the issues suggest that diverse sectors of the cegep community need to collaborate to ensure that computer-based teaching materials and resources are accessible to students with different impairments. In this regard, we recommend that multidisciplinary computer accessibility advisory committees be constituted in the cegeps, with representation, at a minimum, by students with different disabilities, by professors, by those responsible for providing computer related services to cegep students with disabilities, and by someone from computer support services as well as administration. Such committees could benefit from the expertise of academic computer staff, adaptive computer technology specialists, librarians, audio-visual specialists, and rehabilitation professionals, among others. Creative partnerships and alliances are urgently needed.

In addition, we suggest better coordination and collaboration between cegep disability service providers and provincial agencies, programs, and departments which are responsible for providing equipment subsidies and computer and adaptive computer technologies to students for off-campus use. This would allow for better coordination and better information dissemination about what is really required to meet the forthcoming computer related needs of students with disabilities.

As we write this report, planning for campus-wide information technology purchases and computer infrastructure improvements in the cegeps are actively proceeding. The needs of students with disabilities are simply overlooked in much of the planning until it is discovered, often much too late, that the expensive new campus-wide technology is inaccessible. This is not done through malice but through lack of forethought. Designing for accessibility always results in better, less expensive, and more timely solutions than retrofits. Implementing accessibility features in the initial design of a system results in fewer design, construction and legal expenses. It is important to ensure that the needs and concerns of students with all types of disabilities are represented in planning decisions from their inception. Data to guide decision making and specific recommendations concerning what could be done to ensure full access to the new computer and information technologies in cegep education for all students are included in this report. In particular, we provide concrete, practical recommendations for:

- professors and educators
- individuals responsible for providing services to cegep students with disabilities
- government, agencies and organizations that help students obtain computer technologies.

Contact Information

For additional information and the full report, consult the Adaptech web page or contact one of the principal investigators.

Catherine S. Fichten, Ph.D. <md71@musica.mcgill.ca> (e-mail)
Maria Barile, M.S.W. <mdb2@musica.mcgill.ca> (e-mail)

Adaptech Project
Dawson College
3040 Sherbrooke St. West
Montréal, Québec, Canada H3Z 1A4
(514) 931-8731 (voice)
(514) 931-3567 (fax)
http://omega.dawsoncollege.qc.ca/adaptech (Adaptech Project Web Site)

L'accessibilité au cégep pour tous:
Projet ITAC - informatique et technologies adaptées dans les cégeps pour les étudiants handicapés
Rapport final présenté au PAREA

Catherine S. Fichten, Ph.D., Maria Barile, M.S.W., Chantal Robillard, M.A.
Avec la collaboration de :
Myrtis E. Fossey, B.A., Jennison V. Asuncion, B.A., Christian Généreux, D.E.C.,
Darlene Judd, D.E.C., Jean-Pierre Guimont, M.Ed.
Projet Adaptech, Collège Dawson, Montréal
2000

RÉSUMÉ DU PROJET

Sommaire

Les résultats de trois recherches empiriques portant sur les besoins et inquiétudes relatifs aux technologies informatiques et adaptatives des groupes suivants sont présentés: les étudiants de cégeps ayant des incapacités, les professeurs de niveau collégial et les répondants locaux qui fournissent des services aux étudiants de niveau collégial. Les résultats majeurs portant sur la situation dans les cégeps du Québec sont soulignés et des recommandations sont proposées dans le but d'éclairer les prises de décisions qui assurent l'accès au cégep à toutes et à tous.

Objectifs

L'objectif global de cette recherche était de fournir l'information permettant d'assurer que les progrès dans le domaine des technologies informatiques, adaptatives et d'apprentissage utilisées dans le milieu de l'éducation et de la formation postsecondaire, reflètent les besoins et les inquiétudes de trois groupes distincts dans les cégeps : les étudiants ayant des incapacités, les professeurs qui leur enseignent et les répondants locaux qui fournissent les services aux étudiants ayant des incapacités dans les cégeps.

Notre but était de fournir une base empirique pour les prises de décisions. Plus particulièrement, l'information recueillie permettra de faire le point sur les pratiques courantes d'acquisition et de gestion des technologies informatiques dans les cégeps. Sur la base des résultats obtenus, nous procéderons à la diffusion des recommandations visant à assurer que les technologies émergentes et que les innovations dans le domaine de l'éducation postsecondaire sont accessibles aux étudiants ayant des incapacités. Afin d'assurer l'intégration complète des étudiants ayant des incapacités dans le système scolaire collégial, nous nous inspirons des philosophies de «À part... égale» (OPHQ, 1984), le «1992 Forum» (Dufour, 1992) et les évaluations récentes menées par l'OPHQ «États généraux sur l'éducation» et «État de situation de la thématique des services éducatifs et de la formation continue» (Allie et Hébert, 1998; OPHQ, 1995).

Dans le cadre de notre recherche, nous désirions répondre aux questions suivantes :

- Quels sont les objectifs éducatifs et sociaux des étudiants de niveau collégial auxquels les technologies informatiques répondent (p. ex., soumission des travaux par courrier électronique, possibilité pour les étudiants à mobilité réduite de se déplacer librement sur l'Internet pendant les périodes de froids extrêmes) ?
- Quelles sont les technologies informatiques inutiles parmi celles qui sont utilisées couramment ? Quelle est la part d'un manque de vision globale dans les épargnes réalisées (p. ex., l'utilisation d'équipement désuet par les étudiants ayant des incapacités) ?
- Comment les variables systémiques interagissent-elles avec les différences individuelles pour faciliter ou entraver l'utilisation des technologies informatiques (p. ex., l'accès gratuit à l'Internet pour les étudiants, programmes de subventions provinciaux qui offrent des technologies informatiques) ?
- Quels sont les aspects que les étudiants, utilisateurs d'ordinateurs, ayant divers types d'incapacités considèrent particulièrement utiles (p. ex., ordinateurs portables utilisés par les étudiants ayant une déficience visuelle complète, accès aux bibliothèques informatisées) ? Comment ces technologies sont-elles utilisées (p. ex., prise de notes en classes, à partir de la maison par le biais d'un modem) ?
- De quelle manière les professeurs croient-ils que l'utilisation des technologies informatiques modifie la nature de leur enseignement au collégial, en particulier en ce qui a trait aux étudiants ayant des incapacités ?
- Que pourraient faire les professeurs pour améliorer l'accessibilité électronique à leurs cours pour les étudiants ayant divers types d'incapacités ?
- Qu'est-ce que les étudiants qui utilisent les ordinateurs, ceux qui n'en utilisent pas, les répondants locaux responsables des services aux étudiants ayant des incapacités, et les professeurs ajoutent-ils à leur liste de souhaits pour un environnement idéal de l'enseignement et de la formation informatisée accessible à tout étudiant peu importe la nature de son incapacité ?
- Quelles sont les caractéristiques des cégeps répondant aux besoins des étudiants ayant des incapacités quant aux technologies informatiques et adaptatives ?
- Les disparités régionales jouent-elles un rôle dans l'accessibilité aux technologies informatiques pour les étudiants ayant des incapacités ?
- Le nombre et la proportion d'étudiants ayant des incapacités dans un cégep donné influencent-ils l'accès aux technologies informatiques et adaptatives sur le campus ?
- Est-ce que les étudiants francophones et anglophones ayant des incapacités ont un accès égal aux technologies informatiques et adaptatives ?
- Jusqu'à quel point les répondants locaux sont-ils bien informés des technologies informatiques et adaptatives qui pourraient être utiles aux étudiants ayant des incapacités ?
- Jusqu'à quel point les programmes provinciaux actuels et les systèmes permettant l'accès aux technologies informatiques et adaptatives répondent-ils aux besoins des étudiants et des cégeps ?

Méthodologie

Cette recherche s'est étalée sur deux ans (automne 1998 – printemps 2000) pendant lesquels nous avons mené trois études avec l'appui de notre comité aviseur avec la collaboration des associations suivantes :

- l'Association québécoise des étudiants ayant des incapacités au postsecondaire (AQEIPS)
- l'Association nationale des étudiants handicapés au niveau postsecondaire (NEADS)
- les répondants locaux de l'ouest du Québec qui fournissent des services aux étudiants ayant des incapacités : Service d'aide à l'intégration des élèves (SAIDE) du Cégep du Vieux-Montréal
- les répondants locaux de l'est du Québec qui fournissent des services aux étudiants ayant des incapacités : les Services aux étudiants handicapés du Cégep de Sainte-Foy
- l'Association canadienne des conseillers en service aux étudiants handicapés au postsecondaire (ACCSEHP)

Lors de la première étude effectuée en 1999, nous avons mis sur pied des groupes de focus comprenant 61 participants : 21 étudiants ayant des incapacités de niveau collégial (9 anglophones et 12 francophones), 25 répondants locaux offrant des services aux étudiants ayant des incapacités (5 anglophones et 20 francophones) et 14 professeurs de niveau collégial (7 anglophones et 7 francophones). Des groupes de focus unilingues ont eu lieu pour chacune des trois catégories de participants à Montréal, à Québec (Sainte-Foy) et à Trois-Rivières.

Lors de la deuxième étude également menée en 1999, 76 étudiants ayant des incapacités de niveau collégial (21 anglophones et 55 francophones) ont rempli un sondage écrit portant sur diverses questions reliées à l'informatique.

Lors de la troisième étude effectuée en 2000, nous avons mené des entrevues téléphoniques structurées auprès de 46 répondants locaux offrant des services aux étudiants ayant des incapacités (6 anglophones et 40 francophones) provenant de cégeps publics de l'est et de l'ouest du Québec dont 22 répondants locaux de grands centres urbains (Montréal, Québec, Hull) et 24 de régions rurales du Québec.

Conclusions majeures

L'utilisation des ordinateurs dans les cégeps

- Bien qu'il existe un intérêt marqué quant à l'utilisation des technologies informatiques dans les salles de classe, l'utilisation de celles-ci n'en est qu'au début de son développement.
- Il existe une variation considérable entre professeurs quant à l'utilisation des technologies informatiques : les différences semblent reliées au programme d'études et à la discipline, les sciences et les techniques de génie civil utiliseraient davantage les technologies informatiques que les arts et les sciences humaines.
- Lorsque les ordinateurs sont utilisés, les logiciels les plus courants sont le traitement de texte (Word), les chiffriers (Excel), PowerPoint et l'Internet. Les étudiants doivent utiliser un traitement de texte pour leurs travaux et effectuer leur recherche sur l'Internet.

- Les professeurs ont souligné que les cégeps disposaient de peu d'équipement pour les professeurs et pour les étudiants : les laboratoires d'informatique sont encombrés, il existe peu d'occasions de se servir des laboratoires d'informatique pour la tenue d'une classe, la disponibilité de l'équipement pour des démonstrations en salles de classe est restreinte et il y a de multiples difficultés techniques lors de démonstrations en salle de classe.
- Une technique pédagogique courante pour les professeurs consiste à afficher les plans de cours et des notes de cours sur une page web.
- Les professeurs sont inquiets quant aux coûts de la mise à jour régulière de l'équipement et des logiciels des laboratoires d'informatique étant donné la durée utile très courte des ordinateurs, de trois à cinq ans.
- Bien que certains professeurs tentent d'utiliser des principes de conception pédagogique à jour qui intègrent les ordinateurs à leurs cours, cette situation n'est pas typique.
- Les professeurs s'inquiètent de l'aspect technologique trop souligné aux dépens de l'aspect pédagogique.
- Selon les professeurs, la situation actuelle demeurera inchangée dans les cinq prochaines années, à l'exception des technologies améliorées, plus rapides et bon marché. Très peu ont fait état de l'engagement mutuel, des communautés d'apprentissage et de pratique, de la construction du savoir, du répertoire partagé des ressources ou d'autres concepts courants en technologie de l'apprentissage.
- Des professeurs ont souligné que certaines pratiques pédagogiques utilisées par les étudiants ayant des incapacités sont également de bonnes pratiques en général (p. ex., gérer les notes de cours efficacement, épeler les noms et les mots difficiles en les écrivant).

Les étudiants de cégeps ayant des incapacités

- Comparativement aux collèges du reste du Canada, les cégeps ont une proportion considérablement moindre d'étudiants ayant des incapacités (c.-à-d. dix fois moins : 1/2% au Québec comparativement à 5 1/2% dans le reste du Canada); cette situation s'est révélée exacte autant dans les cégeps francophones qu'anglophones. Les cégeps anglophones ont cependant une proportion légèrement supérieure d'étudiants ayant des incapacités que les cégeps francophones.
- En général, les cégeps francophones de milieu urbain et ceux de milieu rural ne diffèrent guère. Cependant, lorsqu'ils diffèrent, les cégeps en milieu urbain sont avantagés en ce qui a trait à l'utilisation de l'Internet, des ordinateurs et aux attitudes s'y rattachant.
- Il existe des différences significatives et considérables entre le nombre d'étudiants bénéficiant de services offerts par les cégeps et le nombre "officiellement" reconnu par le ministère de l'Éducation du Québec: trois fois plus d'étudiants bénéficient de services comparativement au nombre qui apparaît aux listes "officielles" permettant de déterminer le financement des cégeps.
- Les différences entre les nombres réels et les nombres officiels existent autant dans les cégeps francophones qu'anglophones et la présence d'étudiants dans les cégeps anglophones ayant des difficultés d'apprentissage ne peut expliquer cette différence.
- Une préoccupation croissante quant à la réponse aux besoins reliés à l'informatique des étudiants ayant des difficultés d'apprentissage a été exprimée par les répondants locaux des cégeps. Bien que ce besoin semble plus important dans le secteur anglophone, il se manifeste de plus en plus dans le secteur francophone.
- Les problèmes majeurs auxquels font face les étudiants et les répondants locaux de niveau collégial comprennent : les coûts élevés des technologies informatiques; les problèmes créés par les technologies adaptatives courantes quant à la compatibilité de réseau, d'équipement matériel et de logiciels; le manque de formation des étudiants et des répondants locaux; le fait de ne pas traiter de l'accès électronique pour étudiants ayant des incapacités lors de cours d'informatique s'adressant aux professeurs; le financement insuffisant et le support informatique insuffisant pour répondre aux besoins futurs.

L'utilisation des ordinateurs par les étudiants ayant des incapacités

- Presque tous les étudiants ayant des incapacités faisant partie de nos études (plus de 90%) utilisent un ordinateur, généralement des ordinateurs compatibles IBM, à la maison ou au collège, en moyenne neuf heures semaine.
- La grande majorité (plus de 80%) des étudiants anglophones et francophones utilisent l'Internet surtout pour la recherche et le courrier électronique (environ 2/3 des étudiants l'utilisent à la maison et 2/3 au collège) en moyenne six heures semaine en plus du temps consacré à l'utilisation d'un ordinateur.
- Presque la moitié des étudiants avaient plus d'une déficience.
- Près du tiers des étudiants ont besoin d'adaptations pour utiliser un ordinateur efficacement (p. ex., logiciel d'agrandissement de l'écran, souris adaptée) même s'ils ne les utilisent pas tous – la raison : manque de disponibilité et les coûts.
- Il existe une tendance marquée quant à «l'interutilisation» des technologies
- (c.-à-d., utilisation d'une technologie conçue pour une incapacité donnée par un étudiant ayant une incapacité différente).
- Des variables utilisées, l'âge et le sexe n'ont qu'une incidence minimale sur l'expérience et sur les perceptions liées à l'informatique.

Le support informatique offert aux étudiants ayant des incapacités

- Les étudiants ayant des incapacités sont généralement inscrits dans des programmes de sciences humaines ou d'arts et lettres; l'utilisation de l'ordinateur dans les cours de ces disciplines n'est pas fréquente.
- Les répondants locaux de niveau collégial ont souligné qu'en ce moment les besoins de services liés à l'informatique ne sont qu'une faible priorité.
- La plupart des cégeps (plus des 3/4) disposent de technologies informatiques courantes ou adaptatives pour les étudiants ayant des incapacités du campus.
- Les répondants locaux signalent que les étudiants apportent souvent leur propre équipement informatique au collège et que la plupart n'ont pas besoin de services informatiques supplémentaires.
- Les services liés à l'informatique ne sont pas mis sur pied de façon systématique, les cégeps ayant un effectif scolaire peu élevé procèdent cas par cas, une approche qui répond aux besoins des étudiants ayant des incapacités selon plusieurs répondants locaux.
- Peu de cégeps ont des comités multidisciplinaires d'accès à l'informatique et les répondants locaux offrant des services aux étudiants ayant des incapacités sont rarement consultés lorsque des décisions sont prises par rapport à l'infrastructure des technologies informatiques et de l'information du campus.
- Lorsque les professeurs ont des difficultés liées à la problématique de l'informatique des étudiants, ils s'informent auprès des étudiants eux-mêmes ou auprès des répondants locaux.
- Les programmes provinciaux de prêt d'équipement qui fournissent non seulement l'équipement pour l'utilisation sur le campus, mais également l'information aux cégeps (offert par SAIDE du Cégep du Vieux Montréal et le Service aux étudiants handicapés du Cégep de Sainte-Foy) ont reçu une évaluation remarquable des répondants locaux offrant des services aux étudiants ayant des incapacités.
- La plupart des cégeps ne prêtent pas d'équipement aux étudiants pour être utilisé à la maison.
- Les étudiants et les répondants locaux n'estiment pas être bien informés quant aux technologies disponibles et des développements en cours.

- Plusieurs répondants locaux ne sont pas au courant des technologies informatiques adaptatives.
- Les répondants locaux bien informés sont autodidactes : ils font l'essai des technologies à la maison, apprennent des étudiants, font des recherches sur le web, entrent en communication avec leurs collègues, etc., ils ne disposent pas de temps pour des cours ou des conférences.
- Parmi les facteurs permettant à une institution de répondre adéquatement aux besoins des étudiants liés à l'informatique, les suivants sont à noter : le financement, l'accès aux technologies informatiques adaptatives, l'accès à l'internet, le support technique, des facteurs reliés au corps professoral et la compétence des répondants locaux.

L'utilisation hors campus des ordinateurs

- Les ordinateurs utilisés hors campus ont été achetés en majorité par les étudiants et leur famille, moins du tiers des étudiants s'est prévalu d'un programme gouvernemental pour faciliter l'acquisition de technologies informatiques pour être utilisées à la maison.
- Les répondants locaux offrant des services aux étudiants ayant des incapacités de niveau collégial ont mentionné que les étudiants ayant des incapacités ont besoin d'obtenir des subventions gouvernementales plus facilement pour acquérir des technologies informatiques destinées à un usage à la maison.
- Les étudiants ayant des incapacités ainsi que les répondants locaux ont souligné les difficultés auxquelles font face les étudiants quant à la mise à jour des ordinateurs qu'ils utilisent à la maison, car certains programmes gouvernementaux ne comprennent pas les mises à jour.
- Même lorsque les agences gouvernementales fournissent de l'équipement à jour, il semble y avoir de longs délais, un choix limité, des conditions restreintes de mises à jour, des formations insuffisantes, des critères d'admission restrictifs et l'inadmissibilité d'étudiants ayant certaines incapacités ainsi que d'étudiants ayant des limitations fonctionnelles majeures jugées “moins graves”.
- Les étudiants de même que les répondants locaux offrant des services aux étudiants ayant des incapacités étaient particulièrement mal informés des programmes gouvernementaux et des programmes offerts par les agences de réadaptation favorisant l'acquisition de technologies informatiques pour l'utilisation hors campus, en particulier, les étudiants ayant des déficiences auditives ne bénéficiaient pas des programmes existants.
- Les étudiants n'ayant pas d'ordinateur à la maison en voulaient un, ceux qui n'avaient pas de portables en voulaient un, ceux qui avaient besoin de technologies adaptatives et qui n'en avaient pas en désiraient et les étudiants qui n'avaient pas accès à l'Internet à partir de la maison, désiraient y avoir accès.
- Les coûts élevés associés à l'acquisition, à l'entretien et à la mise à jour des technologies informatiques ont été les points les plus fréquemment soulevés par les étudiants (autant par ceux qui utilisent les ordinateurs que par ceux qui ne les utilisent pas), par les répondants locaux ainsi que par les professeurs.

Conclusions

Les résultats des trois études convergent sur les points suivants : les programmes d'études collégiales dans lesquels un grand nombre d'étudiants ayant des incapacités sont inscrits (c-à.d., art et lettres et sciences humaines) ne sont pas encore très informatisés. Les répondants locaux offrant des services aux étudiants ayant des incapacités considèrent que le support technique lié aux technologies informatiques ne constitue qu'une priorité modérée. L'utilisation des technologies informatiques est cependant à la hausse dans les cégeps et il existe des inquiétudes quant au financement des technologies informatiques courantes et adaptatives et des services qui y sont reliés pour l'utilisation sur le campus et hors campus. Les répondants locaux de niveau collégial offrant des services aux étudiants ayant des incapacités souhaitent que les étudiants soient mieux équipés pour faire face aux besoins du collégial en matière d'informatique. En effet, les répondants locaux se plaignent du fait que les programmes de subventions du gouvernement et des agences de réadaptation ont des critères de sélection très restrictifs. Ils ont également souligné que les cégeps fournissent des services à bien des étudiants dont les incapacités ne sont pas reconnues par le gouvernement aux fins du financement. Ceci est en effet le cas des étudiants ayant des troubles d'apprentissage des cégeps anglophones et francophones, mais c'est également le cas d'étudiants ayant diverses incapacités (p. ex., problèmes médicaux chroniques, troubles psychiatriques). Un autre résultat majeur révèle que ni les étudiants ni les répondants locaux ne sont au courant des programmes de financement qui existent pour faciliter l'accès aux technologies informatiques hors campus.

La majorité des étudiants de niveau collégial, peu importe le sexe, l'âge, le lieu de résidence, le programme d'études ou le type d'incapacité, peuvent utiliser ou utilisent des technologies informatiques dans le cadre de leurs études. Le nombre et la nature des avantages cités par les participants démontrent l'importance accordée aux ordinateurs dans le succès des étudiants ayant des incapacités.

Le point commun et le plus fréquemment souligné par les trois groupes de participants est relié aux coûts élevés associés à l'achat et à l'entretien des technologies informatiques. Les ordinateurs utilisés hors campus ont été achetés en majorité par les étudiants ou leur famille. Les étudiants ont mentionné qu'ils ne s'étaient pas prévalus de programmes gouvernementaux pour faciliter l'obtention d'un ordinateur ou de technologies adaptatives parce qu'ils en ignoraient l'existence. La solution semble évidente : les organismes, les programmes et les agences qui fournissent de l'argent, des prêts ou des technologies informatiques aux étudiants ayant des incapacités doivent pouvoir joindre plus efficacement les étudiants. Une information (en formats substituts) largement diffusée, offrant des renseignements sur les occasions disponibles aux étudiants, au personnel responsable de l'aide financière et au personnel responsable des services aux étudiants ayant des incapacités dans les cégeps s'avère clairement nécessaire.

Environ la moitié des étudiants de notre échantillon avaient deux déficiences/incapacités ou plus, révélant, par conséquent, le besoin de postes de travail adaptés à une variété d'incapacités. À ce sujet, nous avons remarqué que de plus en plus d'étudiants ayant un type d'incapacité utilisaient des technologies adaptées à un type différent d'incapacité. Par exemple, le logiciel qui lit ce qui apparait à l'écran, les moniteurs à grand écran et les digitaliseurs (*scanner*) utilisés avec les logiciels de reconnaissance optique de caractères étaient utilisés non seulement par les étudiants ayant une déficience visuelle, mais également par ceux ayant un trouble d'apprentissage. Les logiciels de reconnaissance vocale (dictée) sont utilisés par les étudiants ayant un trouble d'apprentissage et par les étudiants éprouvant des difficultés de mobilité au niveau des mains ou des bras. L'usage multiple des technologies adaptatives constitue un développement important. De plus, le nombre croissant d'options d'accessibilité comprises dans les produits courants intéressent considérablement les étudiants ayant des incapacités. Cependant, de récents développements dans les technologies adaptatives de pointe rendent encore plus important le fait que différents types de technologies adaptatives doivent pouvoir s'intégrer et être polyvalents. Ceci représente un point d'une grande importance car il existe des problèmes de compatibilité entre diverses technologies informatiques adaptatives. En particulier, il existe des problèmes relatifs aux exigences de la carte vidéo pour les logiciels d'agrandissement, à l'équipement matériel lourd, aux exigences de la formation pour les programmes de reconnaissance vocale et aux problèmes de compatibilité avec les programmes de reconnaissance vocale et les logiciels qui lisent ce qui apparaît à l'écran. La compatibilité avec Windows NT devient rapidement une priorité.

Les ordinateurs sont perçus comme une technologies habilitante préparant les étudiants ayant des incapacités à l'économie de l'avenir reposant sur les connaissances. Afin de planifier l'avenir, plutôt que de se mettre à jour, nous suggérons que des consultations de grande envergure aient lieu dans les cégeps, les organismes et les agences qui fournissent l'équipement et la formation aux étudiants ayant des incapacités. Évidemment, ces consultations devront inclure les étudiants qui, en bout de ligne, sont les utilisateurs des technologies. Étant donné la complexité de la problématique, divers secteurs de la communauté collégiale doivent collaborer afin que le matériel didactique informatisé et les ressources soient accessibles aux étudiants ayant diverses incapacités. À cet effet, nous proposons la mise sur pied de comités aviseurs multidisciplinaires d'accès à l'informatique et que ces comités soient constitués d'étudiants ayant des incapacités, de professeurs, de répondants locaux responsables des services aux étudiants ayant des incapacités, de représentants du service d'informatique et de l'administration. De tels comités pourraient profiter des connaissances et de l'expérience du personnel enseignant l'informatique, de spécialistes en technologies informatiques adaptatives, de bibliothécaires, de spécialistes en audiovisuel et de professionnels en réadaptation. Des partenariats et des ententes s'avèrent nécessaires.

De plus, nous proposons qu'une meilleure collaboration existe entre les répondants locaux au collégial et les agences provinciales, les programmes et les services responsables de fournir l'équipement subventionné et les technologies informatiques adaptatives aux étudiants pour être utilisés hors campus. Ceci permettrait non seulement une meilleure collaboration mais également une meilleure diffusion de l'information en ce qui a trait aux besoins réels et futurs des étudiants ayant des incapacités.

Au moment de la rédaction de ce rapport, la planification et la prise de décisions portant sur l'achat de technologies informatiques et sur l'amélioration de l'infrastructure informatique sont en cours dans les cégeps. Les besoins des étudiants ayant des incapacités ne sont pas pris en considération jusqu'à ce que l'on découvre, souvent trop tard, que les technologies coûteuses implantées à travers les campus leur sont inaccessibles. Ceci n'est pas prémédité, mais résulte plutôt d'un manque de prévoyance. Concevoir des adaptations représente une solution moins coûteuse et plus adéquate qu'une modification rétrograde. Il est en effet moins coûteux d'incorporer des caractéristiques d'accessibilité lors de la conception originale d'un système et les frais de conception, d'assemblage et juridiques en sont diminués. Il est important de prendre en considération les besoins et les attentes des étudiants ayant diverses incapacités lors des prises de décisions. Nous joignons à ce rapport des données offrant des directives quant aux prises de décisions et des recommandations spécifiques visant à assurer l'accessibilité complète aux technologies informatiques et de l'information dans le milieu de l'éducation au collégial à tous les étudiants. En particulier, nous proposons des recommandations concrètes et pratiques:

- aux professeurs et aux éducateurs
- aux répondants locaux de niveau collégial responsables des services aux étudiants ayant des incapacités
- au gouvernement, aux agences et aux organismes gouvernementaux qui facilitent l'obtention de technologies informatiques.

Information pour nous joindre

Pour de plus amples renseignements ou pour un exemplaire complet du rapport, veuillez consulter la page web Adaptech ou entrez en communication avec l'une des principales auteures.

Catherine S. Fichten, Ph.D. <md71@musica.mcgill.ca> (courriel)
Maria Barile, M.S.W. <mdb2@musica.mcgill.ca> (courriel)

Projet Adaptech
Collège Dawson
3040, rue Sherbrooke ouest
Montréal (Québec) Canada
H3Z 1A4
(514) 931-8731 (voix)
(514) 931-3567 (télécopieur)
http://omega.dawsoncollege.qc.ca/adaptech (Site web du Projet Adaptech)

INTRODUCTION

Preamble

As Québec becomes increasingly reliant on a knowledge-based, technology-driven economy, people with disabilities will have an unprecedented opportunity to participate fully in the social and economic life of their communities. Whether this comes to pass depends on whether people with disabilities have the same opportunities as other members of society to learn and use the new computer and information technologies. These have the potential to enable or to create difficulties for people with disabilities, making concerns about the accessibility of these technologies an evolving issue for the next decade. This is especially true in the postsecondary arena, as this is the training ground for the labour force of tomorrow.

Designing for accessibility from the outset always results in better, less expensive, and more timely solutions than retrofits (e.g., Coombs, 1998; Ekberg, 1999; Falta, 1992; Jacobs, 1999; Node Networking, 1998). Planning for campus-wide information technology purchases and computer infrastructure improvements in the cegeps is actively going on as this report is being prepared. It is important to ensure that the needs and concerns of students with all types of disabilities are represented in planning decisions from their inception.

Objectives

The overall objective of this research was to provide information needed to ensure that advances in computer and learning technologies in the delivery of cegep education and training reflect the needs and concerns of three groups: cegep students with different disabilities, the professors who teach them, and the personnel responsible for providing disability related services who make technological and other academic supports available to cegep students with disabilities.

The data we present provide an empirical basis to assist with current practices in the acquisition and administration of computer and learning technologies in the cegeps. Our intent is to show how these can be inclusive of the needs of people with all types of disabilities and impairments and to disseminate recommendations based on our findings to ensure that the new computer and information technologies conform to the policy objectives related to the full and complete integration of individuals with disabilities in the cegeps enunciated in "À part...égale" (OPHQ, 1984), the "1992 Forum" (Dufour, 1992), and the recent evaluations by the Office des personnes handicapées, "États généraux sur l'éducation" and État de situation de la thématique des services éducatifs et de la formation continue".(Allie & Hébert, 1998; OPHQ, 1995)

Background

The coming of age of computer technologies has resulted in rapid changes in both theory and practice in postsecondary education (cf., APOP, 2000; America's 100 Most Wired Colleges - 1999, 2000; Campus Backbone Connectivity, 1999; Cuneo, 2000; EDUCAUSE Online Guide to Evaluating Information Technology on Campus, 2000; Office of Learning Technologies, 1998). Multimedia, web based delivery of course materials, virtual communities, and learner rather than teacher centered approaches have resulted in a resurgence of interest in enhancing postsecondary teaching and learning. Much of the excitement about conceptual and theoretical developments is, at this time, more evident in the literature rather than in practice (cf., The 1998 National Survey of Information Technology in Higher Education, 1998).

There is no solid evidence proving that computer assisted instruction is superior to traditional teacher-led instruction (cf., Russell, 1997, 1999). What is clear, however, is that in the foreseeable future newly emerging educational media are not only here to stay but will proliferate (e.g., Farrell, 1999; Mercier, 1999; Office of Learning Technologies, 1998a, 1998b). Many postsecondary institutions and faculty are scrambling to acquire the basic skills needed to function given the new realities (cf., Cuneo, 2000; UCLA Graduate School of Education & Information Studies, 1999).

It should come as no surprise that professors, like many other groups in postsecondary education, generally don't know what kinds of things to do to ensure that their students with disabilities have access to their electronic course materials (cf., Banks & Coombs, 1998). Indeed, many do not know that computer technologies are accessible to students with most disabilities, including those who are blind or have low vision (cf., Apple & Special Needs, 2000; IBM, 1999, 2000; Microsoft, 1999). Paradigms for how best to incorporate computer technologies into courses in specific disciplines are not yet evolved (Cuneo, 1997). Therefore, much energy goes into the design of electronic courseware, in both English and French institutions (APOP, 2000; LTReport, 1999). Regrettably, as is the case for overall institutional instructional technology and infrastructure planning, access concerns of students with disabilities are simply not considered by professors either.

Most professors have not thought about which features of software and hardware make them inaccessible and they have little idea about how access problems could be circumvented or solved (e.g., that some educational CD-ROMs have fonts that are too small to see for some students with visual impairments, that tables and PowerPoint and Adobe Acrobat PDF files can cause problems for many students who are blind, that some students have problems with accessing web sites due to screen sizes and colors, that students with hearing impairments will probably miss the audio portions of video clips and have problems with audio on web pages and most CD-ROMs, that some students have problems in computer labs when they need to use a mouse). Needless to say, solutions to such problems are also not evident.

The present research examined the computer and adaptive computer technology needs and concerns of cegep students with disabilities, cegep professors, and cegep personnel responsible for providing disability related services to the students with disabilities. The results highlight issues of importance and underscore how crucial barrier free (universal) design in courseware, electronic teaching and learning materials, and campus information technology infrastructure really are.

Computer, Learning, And Adaptive Computer Technologies In Postsecondary Education

Equipment, training programs, opinion, technological adaptations, case studies, demonstration projects, web sites, on-line journals of opinion, and policy statements proliferate. For example, there are several books written on the topic of computer, information and adaptive technologies (e.g., Alliance for Technology Access, 1994; Brown 1989; Cunningham & Coombs, 1997; Cook & Hussey, 1995) as well as annotated bibliographies (e.g., Learning Disabilities Association of Canada, 1996; Roeher Institute, 1996). Trend setting American organizations such as Equal Access to Software and Information (EASI) (cf., EASI web page) and the Trace Center (e.g., Trace Research & Development Center, undated) have published extensively on the topic. Canadian sources, such as "The Node" have hosted forums and published listings of resources (e.g., Staff Writers, 1998) and the National Library of Canada has published a manual on accessible libraries (Scott, 1996). The University of Toronto hosts the rich web site of the Adaptive Technology Resource Centre (ATRC) (cf. ATRC web site) as well as the successful SNOW (Special Needs Opportunity Windows) Project, which supports educators of students with disabilities (cf. SNOW web page). Sophisticated, technologically well-versed individuals responsible for providing services to cegep students with disabilities, such as Joanne Senécal of Cégep du Vieux Montréal, Jean-Charles Juhel of Cégep de Sainte-Foy, and Dr. Alice Havel of Dawson College have presented their views and opinions at well attended conferences. Canadian organizations such as SetBC, have published high tech accessibility guides (Wilkinson, 1996) and francophone on-line resources such as the web site of the OPHQ (cf., web site), that of cegep professor Michel Landry of Cégep du Vieux Montréal (cf., web site), and our Adaptech Project (cf., web site) are available. In addition, prominent Canadian disability advocates have written extensively on this topic (e.g., Cantor, 1998) and investigations concerning the impact of voice recognition software on employment for people with disabilities (Ontario March of Dimes, 1999) have been carried out.

Empirical data about the effective - or ineffective - uses of computer, information and adaptive technologies in postsecondary education are scarce in all countries. In the United States, the Americans with Disabilities Act (ADA, 1990) and related legislation dramatically transformed all aspects of living for people with disabilities. This includes accessibility of postsecondary educational institutions (Bausch, 1994) and of computer technologies (Department of Justice, 2000; Workforce Investment Act Of 1998: Sec. 508, 2000; Waddell, 2000). For example, a recent study by Jeffrey (1996) on using learning technologies to assist students with disabilities in journalism class illustrates the role that the ADA is playing in advancing the use of such technologies, as does the ongoing study of accessible educational multimedia (NCAM/WGBH Educational Foundation, 1999). A large scale demonstration involves the California Community College system. Here, in response to an ADA based investigation, a clear set of guidelines was developed to ensure access to distance education for all students with disabilities (High Tech Center Training Unit, 1999).

Students and their professors. Although there is much discussion about computer and adaptive computer technologies for students with disabilities in both the mainstream and the specialized literatures, there is virtually no empirical research which evaluates their use or usefulness. Notable exceptions concern evaluations of specific strategies for students with learning disabilities (e.g., Learning Disabilities Association of Canada, 1996; Lewis, 1998; Higgins & Zvi, 1995; MacArthur, Graham, Haynes, & DeLaPaz, 1996; Raskind & Higgins, 1998), and appraisals of satisfaction and media usage of students with print disabilities (Epp, 1998). In addition, four recent investigations have explored computer technology needs of postsecondary students with disabilities (Coomber, 1996; Fichten, Barile, & Asuncion, 1999; Hubka & Killean, 1996; Roessler & Kirk, 1998). However, the sample sizes of two of the investigations have been small (Coomber, 1996; Roessler & Kirk, 1998) and computer technology related questions comprised only a minor component of the single large scale study (Hubka & Killean, 1999). Only our own cross-Canada study included a large number of students (almost 800) where the focus was exclusively on computer technologies and students with disabilities (Fichten, Barile, & Asuncion, 1999).

To the best of our knowledge, only two studies investigated concerns of professors about teaching students with disabilities and the use of computer and adaptive computer technologies. Our own (Fichten, Barile, & Asuncion, 1999) and that of Coomber (1996). However, the sample size in both of these studies is very small.

Personnel responsible for providing services to students with disabilities. At most North American colleges and universities, including those in Québec, there is at least one designated person whose responsibility it is to provide disability-related services and accommodations to eligible students with disabilities. Operating on campus out of a specialized office (e.g., Office for Students with Disabilities) or a mainstream one (e.g., Student Affairs), these individuals offer a range of services such as exam accommodations, advocacy, peer tutoring, production of academic material in alternative formats (e.g., on tape, in Braille, etc.), and assistance with specialized computer technologies. Generally, the range of services offered depends on the number of students with disabilities enrolled, the size of the institution, and the number of staff and funding allocated to this function (Fichten, Barile, & Asuncion, 1999a).There are some American (Burgstahler, 1992, 1993; Burris, 1998; Horn & Shell, 1990; Lance, 1996) as well as Canadian studies (Epp, 1996; Fichten, Barile, & Asuncion, 1999; Hubka & Killean, 1999; Wolforth, et al., 1998) on the views of personnel responsible for providing services to students with disabilities as well as about institutional concerns. With the exception of our own investigation, however, in none of these is the focus primarily on the broad range of computer and adaptive computer technologies needed by students with different disabilities in postsecondary education. Even in our own investigation the sample size of individuals responsible for providing services to students with disabilities is relatively small (n=30 participants from colleges and universities across Canada). Because many aspects of the Québec situation are different (cf. AQEHPS, 1999; Leblanc, 1999; Government of Canada, 1996), it is not appropriate to generalize from the U.S. experience. Information is needed about both software and hardware for effective learning by Québec students with a variety of disabilities in cegeps. There were some technology questions included in the latest Canadian NEADS survey (Hubka & Killean, 1999; Wolforth, Connolly, Mellway, Hubka & Killean, 1998). The present investigation differs from both the NEADS survey as well as from our own previous work (Fichten, Barile, & Asuncion, 1999) in many ways, not the least of which is that ours is the first series of studies where the focus is exclusively on cegep students', cegep service providers', and cegep professors' views and concerns about their involvement with computer and adaptive computer technologies and where the needs and concerns of individuals attending francophone institutions are systematically investigated.

Postsecondary Education For People With Disabilities

Canada's community colleges and universities provided postsecondary education to well over a million Canadians in 1998-99 (Statistics Canada, 1999a, 1999b). The 48 public cegeps accounts for more than 150,000 of these (Ministère de l'éducation, 2000). "Postsecondary education has been targeted as one of the key vehicles for providing a labour force ready to meet the challenges of the new workplace. Human Resources Development Canada estimates that nearly half of the jobs created in the next decade will require a minimum of 17 years of education" (Butlin, 1999, p. 9). Canada has fared well in this respect as we hold second place (after the US) for the proportion of the population which held a degree and fourth in the world for any postsecondary education (Colombo, 1994, p. 74). Data for Québec show that in the latest census (cited in Stahlman, 2000), Montréal had a larger proportion of university students than any of the other 29 largest Canadian and American cities.

Computer technologies are rapidly expanding in all fields and are becoming important tools in our new economy. Consequently, computer-related knowledge is imperative to secure employment. Computer literacy and know how must become part of everyone's education. To ensure that people with disabilities form an integral part of the new economy, it is important that new learning and information technologies are accessible to them (Pettigrew ,1998). Consistent with this stance, the new policy document "Future directions / Orientations Futures" recently published by the Government of Canada (Développement des ressources humaines Canada, 1999) highlights problems caused by systemic barriers and stresses the need for access to information and technology for people with disabilities in the new knowledge based economy.

It is only in the past two decades that institutions of higher education have begun to recognize the need to grant accommodations to people with disabilities (Fichten, Bourdon, Creti, & Martos, 1987; Leblanc, 1999). During this time, the number of people with disabilities in postsecondary education has increased dramatically (Henderson, 1992; Hill, 1992, 1996; Lavoie, 1986; Leitch, 1995; Louis Harris & Associates, 1994; McGill, Roberts, & Warick, 1994; Tousignant, 1995; Wolforth, 1995). Indeed, the 1999 Louis Harris & Associates poll in the US (cited by the National Organization on Disability, 1999) showed that in the United States, "by 1998 more than half of adults with disabilities (51%) had completed some college - a proportion almost identical to that for the nondisabled population." Projections based on the 1991 Health and Activity Limitations data (cf., Fawcett, 1995) and on evaluations made by the OPHQ (Allie & Hébert, 1998; OPHQ, 1995) suggest that this figure is likely to be lower in Canada. Indeed, according to the recently released report, "À l'unisson : Une approche canadienne concernant les personnes handicapées," 6% of Canadians with disabilities hold a university degree (Ministres fédéral, provinciaux et territoriaux responsables des services sociaux, 1998); the comparable figure for nondisabled Canadians is 14%.

Postsecondary education for people who have a disability is important for the same reasons as it is for nondisabled people; it helps to fulfill personal goals, allows for effective competition in the job market and contributes to independence and financial security. Estimates of the number of Canadian and American postsecondary students with some disability have ranged from 5% to 11%, with colleges having a larger proportion of students with disabilities than universities (CADSPPE, 1999; Henderson, 1995, 1999; Horn & Berktold, 1999; Hurst & Smerdon, 2000; Greene & Zimbler, 1989; Disabled Students in Postsecondary Education, 1997). Our own data, obtained through interviews with a large number of individuals responsible for providing services to students with disabilities, shows a lower value (3%), although this reflects only students with disabilities who are registered to receive services from the institution (Fichten, Barile, & Asuncion, 1999). Our data, consistent with American findings (e.g., Henderson, 1995, 1999; Horn & Berktold, 1999), show that the percentage of students with disabilities is substantially greater in colleges than in universities (3-1/2% vs. 1-1/2%). Data from the United States show that graduation rates are similar for students with (54%) and without disabilities (64%) (Horn & Berktold, 1999).

In fact, postsecondary education is more important for people who have a disability. It has been shown, for example, that although employment figures for university graduates with disabilities is somewhat lower than that of their nondisabled peers both in America (e.g., Horn & Berktold, 1999) as well as in Canada (e.g., Fawcett, 1996), once employed, salaries are similar, and their rates of employment are still substantially higher than that of students who did not complete university, who, in turn, fare better than those who never went to college (Fawcett, 1996; Government of Canada, 1996; Louis Harris & Associates, 1994). Recently, some institutions have started to systematically track the post-school outcomes for their graduates (e.g., Leblanc, 1999; Wolfe, & Stokley, 1998). The findings indicate that students with disabilities take longer to graduate than their nondisabled peers, and that they take longer to find a job. Because employment of individuals with disabilities remains a thorny issue (cf., Vargo, 1997), postsecondary education is especially important. Canadian data on postsecondary students and graduates with disabilities indicates that most want to work (Hubka and Killean, 1996).

Students With Disabilities In Québec

The situation of college students with disabilities in Québec is different from that of students in the rest of Canada in a variety of important ways. First, and perhaps most important, the language of instruction (and of computer and adaptive computer technologies) in most cegeps is French. Second, the conceptualization of disability is very different in Québec from that of the rest of Canada (e.g., Fougeyrollas, Cloutier, Bergeron, Coté, & St. Michel, 1998; Lemieux-Brassard, 2000). Third, in Québec high schools end in grade 11, and students who plan on pursuing a university education must complete a 2 year cegep program of pre-university studies. This system is unique to Québec. Moreover, there are many important differences between Québec's cegeps and community colleges in the rest of Canada. In particular, there is the requirement in the cegeps that students take at least some academic literature and humanities courses, regardless of the nature of their program. It is, in part, this requirement that may makes cegeps more "academic" than some other Canadian colleges.

Language issues. Of 34 countries surveyed by the Angus Reid Group (2000) in the fall of 1999, Canada tied for 2nd place in "home PC penetration" and ranked 2nd in internet use, with 56% of the population after the US (at 59%). Statistics Canada (1998) data show that the proportion of households with at least one internet user increased by 25% from 1997. Home use of the internet increased by 44% during this time, accounting for 23% of all households. It is likely that these figures have continued to grow during the past 2 years.

It is evident that English is the predominant language of both the computer industry and of the internet, as France ranked 19th with 22%, while Belgium ranked 15th, with 28%. Another study, conducted by PricewaterhouseCoopers (2000), shows internet use in France at 10%. Recently there have been efforts in France to increase the use of the internet to deliver higher education (Giudice, 2000).

Québec has been at the forefront of computer and internet use in the francophone world, and it has followed the North American rather than the European trend. For example, Québec offers distance education in French both at the university as well as the cegep levels. In addition, data from telephone interviews conducted by Ad Hoc Recherche with a sample of 493 Quebeckers during 1999 (cited by Labrèche, 2000) indicate that more than 30% of Quebeckers have a home computer and that 52% use the internet. Another recent investigation shows that Québec's computer integration in the elementary and secondary schools is similar to that of the rest of Canada (Statistics Canada, 1999), although home access to the internet is somewhat lower in Québec (29% compared to 48%) PricewaterhouseCoopers (2000).

It is clear that the integration of computer-mediated and web-based learning into curricula are top priorities at schools across North America. "Information technology spending by (American) colleges and universities is expected to jump from $3.1 billion in 1998 to nearly $5 billion by 2003 in an effort to attract students and stay current in computer technology," predicts International Data in the report "IT Spending Forecast for Higher Education Institutions, 1998-2003" (1999). There are similar trends in Québec postsecondary institutions and, as noted recently at the Congrès de l'Association canadienne de l'éducation à distance (ACED) hosted by Laval University, the knowledge based economy and development in online education has not bypassed Québec (Cartier, 2000).

Consistent with this trend, computer technologies are rapidly becoming a part of the everyday lives of the cegep community: professionally, personally and academically. Because computer knowledge is a necessity for effective participation in the new Québec economy, computer training is part of most postsecondary students' formal education. One need only look at Québec colleges and universities to see this trend in action. For example, social science students at Dawson College must be proficient in Microsoft Word and Excel to graduate, and a pilot project at Vanier College (Dedic, Rosenfield, Cooper, & Fuchs, 2000) has students learning calculus via the internet. As is evident from the numerous and varied presentations at the recent conference of the Association pour les applications pédagogiques de l'ordinateur au postsecondaire (APOP, 2000) held at Cégep Marie-Victorin, there are numerous exciting initiatives across the cegep system in francophone colleges.

Data concerning the use of computers and the internet in the cegeps suggest that almost half of cegep professors, regardless of age or years of experience, use some type of computer assisted learning in their courses (Jacques Joly Consultant Inc., 1999). Cegep-based organizations, such as the group of 5 organizations which jointly publish Clic, a newsletter for pedagogical applications of computers in the postsecondary education sector (i.e., CCDMD - Centre collégial de développement de matériel didactique; La Vitrine APO - Applications Pédagogiques de l'Ordinateur; APOP - l'Association des applications pédagogiques de l'ordinateur au postsecondaire; CCFD - Centre collégial de formation à distance at Collège de Rosemont; CDC - Centre de documentation collégiale) are well positioned within the context of postsecondary education in Québec (Office of Learning Technologies (1998). It is up to organizations such as these to develop French educational products suitable for use in the cegeps. We have worked hard to try to ensure that the concerns and needs of students with disabilities become a priority within these groups (e.g., Asuncion, Fichten, & Barile, 2000 May ; Barile, Fichten, Robillard, Fossey, Généreux, Guimont, 2000 May; Fichten, Généreux, Asuncion, Lavers, Guimont, Barile, & Alapin, 1998 June; Fichten, Barile, & Asuncion, 1999; Fichten, Barile, Robillard, Fossey, Généreux, & Guimont, 2000 June; Fichten, Lavers, Barile, Asuncion, Généreux, & Robillard, 1999 May).

Persons with disabilities. Among the goals of the Ministère de la Santé et des Services sociaux (MSSS) for the year 2002 is to, "diminuer les situations qui entraînaient un handicap pour les personnes ayant des incapacités, quelles que soient l'origine et la nature de ces incapacités." Much remains to be done, including an improvement in meeting the needs of persons with permanent disabilities, increased collaboration between the various groups involved in providing services, more equitable benefits to persons whose disabilities stem from different causes, better equipment for schools, improvement of pedagogical approaches, and better workplace integration (Objective 19, MSSS, 1992, pp. 125-127). Specific objectives include (1) removing barriers to an active social and economic life, (2) providing technical aids, and (3) support at school. The first priority concerns school and vocational integration (MSSS, 1992, p. 128).

In parallel with developments in postsecondary education and in government social policy initiatives in Québec is the rapid evolution of adaptive computer technologies. For example, in Québec, VisuAide, a leading company in the field of adaptive technology, is developing French language screen reading software programs that help persons with visual impairments better use Windows applications. The trend is also evident in the computer and adaptive computer technologies holdings of technologically sophisticated rehabilitation agencies (e.g., Institut Nazareth & Louis Braille, Montreal Association for the Blind, Centre de Réadaptation Lucie Bruneau) as well as cegep adaptive computer technology loan banks (e.g., Parc mobile des appareils: Senécal 2000b). As noted in our publication of free and inexpensive computer technologies for students with disabilities (Fichten, Lavers, Barile, Asuncion, Généreux, & Robillard, 1999), there are a variety of inexpensive products that work in French as well. Together, trends in postsecondary education and in the adaptive computer industry have the potential to level the playing-field and provide Québeckers with disabilities access to the same opportunities as their nondisabled peers. This outcome is, of course, conditional on them gaining timely access to the technologies and adaptations they need. Indeed, it was one of the objectives of the present investigation to provide information to enable the potential to be realized.

Accessibility and computer and adaptive computer technologies in the cegeps. In a recently completed M.Ed. thesis (co-supervised by one of us - Fichten) Champlain College's director of student services André Leblanc chronicled the history of the integration of students with disabilities into the cegep system (Leblanc, 1999). We will not repeat this information here, as the thesis is readily available. What is of relevance to the present report is the situation in the cegeps as it relates to funding of computer and adaptive computer technologies for students with disabilities. Two issues are of importance: equipment for use on campus in the cegeps and equipment for students for off campus and home use.

The current situation regarding computer and adaptive computer technologies for students with disabilities for on campus use in the cegeps is as follows. Cegeps receive funding for services from the Ministère de l'éducation du Québec for each student with a disability for whom they have completed and have had approved an individualized education plan (IEP/IIP). An IEP/IIP is completed by each cegep for all students with visual, hearing or motor impairments who need services from the college; students with learning disabilities are not eligible. The same is true for students with psychiatric impairments and a variety of chronic medial conditions. Funds are attributed annually based on a formula. The cegeps can also borrow computer equipment from a provincial loan bank. This is run by the Service d'aide à l'intégration des élèves (SAIDE - Cégep du Vieux Montréal) for the western sector of the province (cf., Senécal 2000b for a listing of available equipment) and by le Services aux étudiants handicapés du Cégep de Sainte-Foy for the eastern part of Québec; Dawson College plays a central role on the anglophone side (Ministère de l'éducation du Québec, 1998). In addition to the loan bank, cegeps also purchase specific items if these are in high demand (Alice Havel, personal communication, June, 2000).

To obtain computer equipment for off campus personal use, students with "major functional limitations" can apply to a variety of Québec programs and agencies depending on the nature of their impairment. Students with "serious" visual and hearing impairments can apply to programs which are funded by the Régie de l'assurance maladie du Québec (RAMQ). Students with other "serious" impairments can apply to the Ministère de l'éducation du Québec (MEQ) provided that their situation is not covered by another agency or program (Ministère de l'éducation du Québec, Direction générale de l'aide financière aux étudiants, 1995). Students with learning disabilities are not eligible.

Universal Access and the Use Of Computer, Information And Adaptive Technologies By People With Disabilities

The digital divide. "These new technologies hold great promise, but as this report (based on data from the U.S. based National Telecommunications and Information Administration's "Falling through the net: Defining the digital divide," 1999) study), makes abundantly clear, the computer revolution has left the vast majority of people with disabilities behind. Only one-quarter of people with disabilities own computers, and only one-tenth ever make use of the Internet." (Kaye, 2000).

Barrier free design. Over the years, those working to promote access for people with disabilities have learned two important lessons. First is the cost-effectiveness of incorporating universal accessibility features at the outset of a project (e.g., Connell, et al., 1995; Ekberg, 1999; Jacobs, 1999; Node Networking, 1998). For instance, implementing accessibility features in the initial layout of a building results in fewer design, construction and legal expenses (Falta, 1992). Second is the need to consult with progressive and sophisticated consumer groups. These individuals' diverse backgrounds make them uniquely qualified to think of creative solutions to environmental barriers created by lack of access. Consistent with this stance, here we present the views of students with disabilities, thereby allowing them a voice in formulating the accessibility agenda. Whether it be related to accessibility issues or to more fundamental curriculum concerns, permitting students a voice in their own education is an approach that is advocated by many learning and instructional theorists and practitioners who see learning and teaching as a shared enterprise between students and teachers (e.g., Brown, 1994; McKeachie, 1994).

Our evolving knowledge-based economy guarantees that computer technologies will be an essential part of education in the next decade. It is vital that any infrastructure that is created to serve students needs to be accessible to people with all types of disabilities from the beginning. This includes computer labs, computers in classrooms, computers in libraries, etc.

Inaccessibility of computer technologies. The characteristics of some existing computer and information technologies prevent access by people with various disabilities (cf. Waddell, 1999). For example, some educational CD-ROMs have small print or a very light background which cannot be changed, and most video clips do not have closed captioning ("subtitles" which can be toggled on and off). Some people have difficulties accessing internet web sites due to screen sizes and colors (Schoffro, 1996), while others, most notably people who are blind, have difficulties because graphic images do not have verbal descriptive tags for text based screen readers and web browsers (Vanderheiden, Chisholm, & Ewers, 1996).

In the past, technologies have worked in the service of people with disabilities by reducing or eliminating barriers and improving a variety of aspects of quality of life (Day & Jutai, 1996). Computer, information and adaptive technologies can continue this trend by working for - rather than against - people with disabilities. Bissonnette's review (1995) shows that the use of technologies to advance the education of people with disabilities has been an ongoing successful process for some time. The benefits of online education for students with disabilities have been described extensively (e.g., Shumila & Shumila, 1998) and there are data available which suggest that use by students with disabilities of computer supports provided on campus for students with disabilities was related to better academic performance (Shell, Horn, & Severs, 1988). Moreover, people with disabilities who have a high level of computer skill were shown to have more favorable employment outcomes (Pell, Gillies, & Carss, 1997). Clearly, new information and learning technologies used for the purpose of assisting all people through life-long learning must continue to be inclusive of people with disabilities.

One goal of our research was to evaluate the existing trend of adapting software to the needs of people with disabilities. For example, companies such as Microsoft, Apple, Adobe, and IBM have made substantial investments in designing accessible software and hardware and in incorporating accessibility features into their mainstream products (Adobe, 1999; Apple & Special Needs, 2000; IBM, 1999, 2000; Microsoft, 1999). People with various physical limitations in both academic and employment settings are becoming aware of the availability of ergonomically designed hardware. An example is keyboards that are easier to use for people with repetitive stress injuries, such as carpal tunnel disorder. Increasingly, specialized adaptive products are taking advantage of new developments in the industry. This makes them less expensive and more compatible with mainstream software and hardware (e.g., Henter-Joyce, 1998). Also, many products intended for the nondisabled population have found special applications. For example, Dragon Systems and Via Voice dictation software products have been enthusiastically embraced by people who have limited use of their arms or hands. In addition, a variety of free and inexpensive adaptive or "adaptable" computer technologies of interest to students with disabilities have become available (Fichten, Lavers, Barile, Asuncion, Généreux, & Robillard, 1999).

As part of the present research, we have also investigated whether students with disabilities are using these technologies. If yes, how satisfied are they? If not, why not? Is it for financial reasons or lack of access (see Hill, 1992, 1996)? Or, is it "computer anxiety," as is the case for many nondisabled students (Hudiburg, Ahrens, & Jones, 1994; Osman & Muir, 1994; Rosen & Weil, 1995)?

Conceptual Framework

The findings of this investigation are examined from the perspective of three conceptual frameworks. Fougeyrollas and Lippel's (1999) PPH model (Processus de production du handicap / Disability Creation Process) is the primary analytical tool, although both the social model of disabilities (Oliver 1990, 1996) as well as the economic model (Bickenbach, 1993) are used.

Processus de production du handicap / Disability Creation Process (PPH) Model

To best understand the populations being studied we use the PPH model (cf., Fougeyrollas et al., 1999), which reflects Québec's realities. The PPH model was designed in Québec and is widely used in the community of people with disabilities. For the purposes of our report, we are interested in three elements of this model:

Situation d(e) handicap. This corresponds to reduced ability to perform daily activities which result from the interaction between personal and environmental factors - environmental facilitators or environmental obstacles (Lemieux-Brassard, 1996). Daily activities include getting dressed, preparing meals, cleaning the house, as well as social roles such as maintaining a job, studying, and bringing up children. This concept emphasizes the abilities of the individual as well as the activities it would take to eliminate the obstacles that the individual encounters. The strengths and choices of both the individual and his/her family are at the center of this approach (cf., Fougeyrollas et al., 1999, p. 10.)

Environmental obstacles and facilitators. Those elements that create barriers to access for anyone with impairments. For example, telephones without a "magnetic coil" (also known as an "induction loop") create environmental obstacles for people who use hearing aids. Environmental facilitators are elements that facilitate execution of a task or are created with access in mind. A ramp is a "facilitator" for people who use wheelchairs. They can also be facilitators for people who push baby strollers, carts, etc. In addition, a facilitator for one person can be an obstacle for another. For example, although speech on a CD-ROM may benefit people who have a visual or print impairment, it can be an obstacle for people who have a hearing impairment.

"Habitude de vie" (daily activities) and full participation. With regard to education, daily activities include the ability to read, write, and understand according to the norms expected for a given level. According to Lemieux-Brassard (1996), environmental facilitators in this context are elements that allow participation in social, economic, and political life, "By assuming this truly socio-economic actor role, we become agents of social change, and so we'll be able to bring about the transformation of obstacles to facilitators" (p.19). According to the model, the goal is full participation, which can only happen if a person is able to perform daily activities required for specific tasks.

Definitions of impairment and disability. Impairment corresponds to the degree to which a person is affected anatomically, histologically, and physiologically. This can include amputation, muscular-skeletal lesions, dysfunctions of the nervous system, the ocular or auditory systems, as well as genetic or chromosomal abnormalities. Disability corresponds to a degree of reduction of ability. Disability can be intellectual, behavioral, motor, or sensory.

The PPH model is, in many ways limited to individual problem identification and solutions rather than collective ones (cf., Schneider, 2000). To complement parts of the PPH model and, thereby, provide a more comprehensive account of the results, in our analyses we also utilize a social model of disabilities (Oliver, 1990;1996) as well as an economic model (Bickenbach, 1993; Echenberg, 1997).

Social Model Of Disabilities

The social model of disabilities (cf., Oliver, 1990;1996) contains two elements: impairment (i.e., "lacking part or all of a limb, or having a defective organ or mechanism of the body") and disability (i.e., "a disadvantage or restriction of activity caused by a contemporary social organization which takes no or little account of people who have physical impairments and, thus, excludes them from the mainstream of social activities") (UPIAS, 1976, pp. 3- 4 cited by Oliver, 1990, p.11). This model states that problems are located in the social construction and production of disability. It focuses on the hegemony caused by the lack of access to resources available to nondisabled persons and unequal distribution of opportunities in society; this includes education and the means and tools to achieve it (Barnes 1996). The model maintains that these inequities create discrimination, poverty, and segregation. This model refers to "disabling environments" (Oliver, 1993) to indicate both physical and environmental conditions and influences as well as the social and cultural forces that shape the life of a person or a population:

Economic Model Of Disability

"The economic model views disability primarily as a deficit in human capital that limits labor force participation and it proposes strategies for overcoming that deficit through individual enhancement" (Echenberg, 1997, p. 27). Hahn (1985) further states that in some countries the model also determines pension amounts on the basis of arbitrarily defined degrees of disability. This model is also used to analyze the costs of disability and disability-related programs and can be used to evaluate how existing policies deal with economic issues related to disability (cf., Bickenbach, 1993; Echenberg, 1997). Such views of disability allow for criteria that divide qualifying or deserving from non-qualifying (non-deserving) persons with disabilities – a form of discrimination in it's own right.

Overview Of The Research

The research which forms the basis for this report lasted 2 years (Fall 1998 to Spring 2000). During this time we conducted a series of 3 studies.

In Study 1, carried out in 1999, we conducted focus groups which involved 60 individuals: 21 cegep students with disabilities (9 anglophones and 12 francophones), 25 individuals responsible for providing services to cegep students with disabilities (5 anglophones and 20 francophones), and 14 cegep professors from both arts and science disciplines (7 anglophones and 7 francophones). Separate unilingual groups were held for each of the 3 categories of participants. Groups were held in Montréal, Québec (Sainte-Foy), and Trois-Rivières. From these meetings we obtained rich descriptions of the realities in the cegeps as well as broad notions about what some of the key issues of interest to students with disabilities are. This study set the context for the other two.

In Study 2, also carried out during 1999, 76 college students with disabilities (21 anglophones and 55 francophones) completed a survey which dealt with a variety of computer related issues. With the help of our partners and cegep personnel responsible for providing services to students with disabilities we distributed closed-ended questionnaires in both English and French in regular and large print, audiotape, Braille and disk (both IBM-PC and Macintosh). This study provided a quantitative evaluation of the student perspective.

In Study 3, carried out in 2000, we conducted structured interviews with 46 individuals responsible for providing services to cegep students with disabilities (6 anglophones and 40 francophones) at "public" cégeps from both the eastern and western sectors of Québec, including 22 individuals from cities (Montréal, Québec, and Hull) and 24 from the regions. Based on concerns raised in Studies 1 and 2, here, the main focus was on the needs and concerns of individuals responsible for providing services to cegep students with disabilities. These interviews supplied the service provider perspective and gave us much more detailed information on issues associated with computer related services at the cegeps.

PARTNERSHIPS AND LINKS FORGED DURING THE GRANT PERIOD

Partnerships

During the past 2 years we have forged a variety of important and productive partnerships. In particular, we have been working closely with the Québec and Canada-wide postsecondary student groups (AQEIPS and NEADS), with both the western and eastern Québec groups of personnel who provide services to cegep students with disabilities (Service d'aide à l'intégration des élèves (SAIDE) and Le Services aux étudiants handicapés du Cégep de Sainte-Foy), with the Canada-wide professional organization of postsecondary personnel responsible for providing services to students with disabilities (CADSPPE/ACCSEHP), as well as with a Montréal based rehabilitation agency (Mackay Center).

The following organizations are currently partners of our research.

Association québécoise des étudiants ayant des incapacités au postsecondaire (AQEIPS): based at H.E.C. at the Université de Montréal. AQEIPS is interested in the project because of their concerns about ensuring that information and learning technologies used in postsecondary institutions are appropriate and accessible to students with special needs.

Betacom Group - A Canadian assistive devices industry firm. Betacom is a Canadian company specializing in technology for people with disabilities.

Canadian Association of Disability Service Providers in Post-Secondary Education Association / Association Canadienne des Conseillers en Services aux Étudiants Handicapés au Postsecondaire (CADSPPE/ACCSEHP). this is the Canadian association of student services professionals who provide assistance and resources to postsecondary students with disabilities.

Centre for the Study of Learning and Performance (CSLP), Concordia University. The CSLP conducts research in areas including the wise use of technology for learning. The CSLP is a multidisciplinary unit drawing on students and faculty from a variety of graduate programmes at Concordia University including Educational Technology and Psychology. The CSLP also enjoys active links with other postsecondary institutions in Québec.

Comité d'adaptation de la main-d'ouvre pour personnes handicapées (CAMO). An employment agency for people with disabilities based in Montréal, since the fall of 1998 CAMO has been funding a portion of the salaries of some research team members.

Dawson College. Dawson College is interested in expanding its computer, network, and related facilities and in using available research on learning technologies to accomplish this. Dawson is also committed to educational diversity and to the more than 150 students with disabilities currently enrolled.

EvNet (Network for the Evaluation of Education and Training Technologies). This is a national bilingual multi-disciplinary and multi-sectorial high tech research network of 33 academic researchers, 35 practitioners, and 61 public, private and non-profit organizations. It is funded by SSHRC/CRSH.

Mackay Center. This is a rehabilitation center based in Montréal. We have been involved in past research as well as in planning a computer, information and adaptive technologies demonstration facility in partnership with the Mackay Center.

National Educational Association of Disabled Students / Association nationale des étudiants handicapés au niveau post-secondaire (NEADS - based at Carleton University). NEADS is the only Canada-wide association of postsecondary students with disabilities.

Office des personnes handicapées du Québec (OPHQ). Through its work integration program - Contrat d'Integration au Travail (CIT) - since the fall of 1998 the OPHQ has been funding a portion of the salaries of some research team members.

Ordinateur Dream Scape Computers. This company specialises in internet research, software installation and troubleshooting, creation of posters for special events, and computer consulting and training. A specific interest of the firm concerns computer training and adaptation for people with physical, sensory and intellectual deficits.

Service d'Aide à l'Intégration Des Élèves (SAIDE). Based at Cégep du Vieux Montréal. This is the western Québec group of cegep based personnel providing services to college students with disabilities in Québec.

Le Services aux étudiants handicapés du Cégep de Sainte-Foy. Based in Québec City (Sainte-Foy). This is the eastern Québec group of cegep based personnel providing services to college students with disabilities in Québec.

Adaptech's Online Presence

"Where can we go to get information on technology?" This was a comment we heard frequently throughout our research. In response to this need and to alert the virtual community of our existence, we launched two web-based initiatives: the bilingual Adaptech Web Site hosted by Dawson College at <http://omega.dawsoncollege.qc.ca/adaptech> and our bilingual online electronic discussion forum: Adaptech.

The Adaptech Web Site provides a fixed location where individuals are able to learn about our various research projects and publications, find out about who we are and who funds us, and obtain information about our online electronic discussion forum: Adaptech. Visitors are given access to what we think are some of the best online resources on computer and adaptive technologies for students with disabilities at the postsecondary level. Although we list sites of interest from across the world, Québec and Canadian based sites are prominently featured. Our web site is, of course, bilingual and fully accessible. We feel that in our Resource Pages we have assembled some of the best starting points for those who are looking to become better informed about computer, information and adaptive technologies for both anglophone and francophone postsecondary students with disabilities. The list is constantly growing.

In the early stages of our research we decided that for our work to have a strong impact, it had to be "out there" for people to discover. We also firmly believe in "demystifying" our research and in making the process transparent. Conceived as a means to make the research as interactive as possible, our moderated electronic discussion forum (listserv), Adaptech, <adaptech@alcor.concordia.ca> has evolved into an important vehicle for sharing and exchanging information on the use of computer technologies by and for postsecondary students with disabilities. This electronic discussion list is moderated by student team member Jennison Asuncion. What makes this forum different from others is that it is focused on issues of interest to the postsecondary education community. As this document is being written, there are over 240 subscribers. They include students with disabilities, personnel responsible for providing services to students with disabilities, professors, adaptive and mainstream computer experts, and others interested in the themes of our work. We take pride in our ability to link together individuals from communities across Canada and around the world to discuss computer, information and adaptive technologies for students with disabilities. Information concerning how to join the forum is available on our web site.

In publicising both our web site and electronic discussion forum we have deliberately cast a wide net. We have actively promoted our web initiatives not only within the disability community but also within broad sectors of the anglophone and francophone postsecondary education and computing communities. This is in recognition of the fact that if change is to occur, information must be made available to all the players.

During the grant period we have published articles and presented at exhibitions and conferences (these are listed on our web site). In particular, we have made a concerted effort to publicize our work in the cegep community. For example, we have presented at APOP and at ARC, and have had our materials posted not only on ERIC but also on the web sites of La Vitrine APO and the CDC (Centre de documentation collégiale). We have also made a deliberate decision to publish information related to our research bilingually. For example, we have written articles published in both French and English in the newsletters of our two student association partners, AQEIPS and NEADS. We also have had bilingual articles appear in Communiqué, the newsletter of the Canada-wide group of personnel responsible for providing services to postsecondary students with disabilities, as well as in the Canadian special interest group newsletter of its American Counterpart AHEAD. Overall, we are pleased with our efforts at obtaining visibility for the concerns of cegep students with disabilities in the cegep community.

Key Project Personnel

The Research Team

The core research group consists of a bilingual team of academics, students, consumers, and professionals interested in computer, information and adaptive technologies in colleges and universities. Our team is made up of people with vast experience in conducting research of various types and several of us have the personal experience of living with disabilities. We have substantial experience with grant funded research, with information dissemination to various "stakeholder" groups, including people with disabilities, policy makers, end-users, educators, and academics, and, we have conducted projects in collaboration with educational, public and non-profit organizations concerned with issues related to the social integration of people with various impairments and disabilities.

Psychologist Catherine S. Fichten and social worker Maria Barile assumed the overall intellectual direction of the project. Key members of the team are: Chantal Robillard, M.A. (Ph.D. Candidate at Université de Montréal), Myrtis Fossey, B.A. (M.A. Candidate at Concordia University), Jennison V. Asuncion, B.A. With Distinction (M.A. Candidate at Concordia University), Christian Généreux, D.E.C. (B.A. student at Université du Québec à Montréal), and Jean-Pierre Guimont, M.Ed. (audio-visual professional at Dawson College). Other team members supported the objectives by contributing expertise and skills in specific areas. As a research team, most of us have worked together for many years. We have extensive connections with the disability and postsecondary education communities. We also have experience with questionnaires administered on a web site, focus groups, open-ended interviews, content analysis, questionnaire development, and psychometric evaluations. We also have substantial computer and statistical capability.

Catherine S. Fichten, Ph.D. (Psychology Professor at Dawson College): Adaptech Project Director

***Maria Barile, M.S.W.** (Dawson College, Disability Activist and Social Worker): Adaptech Project Co-Director, ITAC Project Director

Chantal Robillard, M.A. (Ph.D. Candidate, Anthropology, Université de Montréal): Research Assistant - Francophone - expertise in qualitative data analysis techniques

Myrtis Fossey, B.A. (M.A. Candidate, Psychology, Concordia University): Research Assistant - expertise in psychometrics

***Jennison Asuncion, B.A. (With Distinction)** (M.A. Candidate, Educational Technology, Concordia University, VP: National Educational Association of Disabled Students "NEADS"): expertise in networking, listservs and information dissemination

***Christian Généreux, D.E.C.** (B.A. Student, Political Science, Université du Québec à Montréal, President of l'Association québécoise des étudiants ayant des incapacités au postsecondaire (AQEIPS): Research Assistant - Francophone - extensive experience with computer needs of people with disabilities and policy issues

Jean-Pierre Guimont, M.Ed. (Webmaster and Information Specialist and Head of Audio/Visual Production, Dawson College): Resource Person - Francophone

Iris Alapin, B.Sc. (M.A. Candidate, Psychology, Concordia University): Research Assistant - Francophone

Rhonda Amsel, M.Sc. (McGill University: Professor, Statistician & Associate Dean of Students): Statistical consultant

***Rachel Fima, D.E.C.** (B.A. Student, Commerce, Concordia University): Research Assistant

***Darlene Judd, D.E.C.** (Montreal Association for the Blind, Dawson College): Research Assistant with extensive interviewing expertise

***Jason Lavers, B.A.** (Montreal Association for the Blind, Dawson College) Research Assistant with extensive microcomputer and web page expertise
Evelyn Reid, D.E.C. (B.A. Student, Psychology, Concordia University): Research Assistant
***Fay Schipper, M.Ed.** (Volunteers Coordinator, Mackay Center): Resource Person
***Raymond Tam, B.F.A.** (Occasional student at Concordia University) - Graphic artist and web page expert - resource person

***These research team members have a disability.**

Advisory Board

To better inform our research, an Advisory Board composed of representatives from the following "stakeholder" groups has been guiding our work: (1) students from cegeps and universities in Québec, (2) academics who specialize in education and disability, (3) cegep and university personnel responsible for providing services to students with disabilities, and (4) specialists from industry, educational institutions and disability organizations. The Advisory Board's support has worked exceptionally well in that it allowed us to have a broader perspective about the realities of both francophones and anglophones in the groups that we were studying.

Advisory Board members were able to participate in all phases of this investigation. They were contacted several times during our current project, mainly through e-mail, but also through the telephone and regular mail. In addition, we have had the support of the subscribers to our listserv Adaptech.

Advisory Board Members

Dr. Phil Abrami (Centre for the Study of Learning and Performance - Concorida University)
Dr. Sally Bailes (Psychologist with expertise in visual impairments - Jewish General Hospital)
***Leo Bissonnette** (Responsible for providing services to students with disabilities - Concorida University)
Serge Brassard (Coordinator - AQEIPS)
***Mario Boulet** (Board Member of AQEIPS and student - Cégep de Rosemont)
Daniel Fiset (Director of the Service d'aide à l'intégration des élèves (SAIDE) - Cégep du Vieux Montréal)
***Dave Gaucher** (Federal government sector)
Dr. Alice Havel (Responsible for providing services to students with disabilities - Dawson College)
Jean-Charles Juhel (Director of le Services aux étudiants handicapés du Cégep de Sainte-Foy)
***Deborah Kennard** (Disability advocate and former Dawson College student - Montréal),
André Leblanc (Director of Student Services - Champlain College)
***Lucie Lemieux-Brassard** (Vice-president - AQEIPS and law student, Université de Montréal)
Brian McCarthy (President of Betacom - an adaptive technology company)
***Roseann Millin** (Counsellor - Dawson College and Ph.D. student at an on-line distance education institution: Greenwich University)
Charles Petit (VisuAide - an adaptive technology company)
Dr. Richard Schmid (Chair, Education Department - Concordia University)
Joanne Senécal (Coordinator - Service d'aide à l'intégration des élèves (SAIDE) - Cégep du Vieux Montréal)
Michelle Serano (Director of Student Services, Dawson College)

Dr. Linda Shohet (Director of the Center for Literacy)
Frank Smith (Coordinator - NEADS)
Dale Szlamcowicz (High tech occupational therapist - Centre de Réadaptation Lucie Bruneau)
Dr. Joan Wolforth (President - Canadian Association of Disability Service Providers in Post-Secondary Education / Association Canadienne des Conseillers en Services aux Étudiants Handicapés au Postsecondaire (CADSPPE/ACCSEHP) - based at McGill University]

***These Advisory Board members have a disability.**

Dissemination

Results will be disseminated to the scholarly community via journal articles and conference presentations. End users will be informed about the findings via conventional (print based final report, magazine and newsletter articles) as well as alternative means, including a web page and broad based distribution to on-line library resources, such as the Centre de documentation collégiale (CDC) and ERIC, as well as listservs and newsgroups. Intended target groups are: cegep students with disabilities, study participants, cegep professors and personnel responsible for providing services to students with disabilities, counselors, administrators and computer technology support personnel in charge of computers at the cegeps, organizations for people with various disabilities, mainstream and adapted software and courseware developers as well as government organizations, agencies and programs which provide computer and adaptive computer technologies to cegep students with disabilities.

In addition, reports will be sent to provincial and local organizations of and for people with disabilities. These organizations will be asked to inform their member groups by way of regular mail or internal newsletter. Similarly, we will send copies to rehabilitation centers, government agencies, professional associations and other groups concerned with the issues. Our partners and Advisory Board will be of great help in assisting us with suitable venues for dissemination of the findings in both the scholarly, consumer, and "gray" literatures.

It should be noted that our team has been particularly effective in disseminating information not only to the scholarly community, but also to the community of end users and policy makers. In the past, we have shared our findings on professor and student interactions with those who educate college students, with rehabilitation professionals, with college students who have disabilities, as well as with the larger disability community (see our "Team CV" on the Adaptech web page at <http://omega.dawsoncollege.qc.ca/adaptech.htm> and Catherine Fichten's CV at <http://omega.dawsoncollege.qc.ca/cfichten>). We will also send copies of our findings to the "media," including mainstream computer and education magazines as well as various magazines for people with disabilities. We have also learned about a variety of French and English newsletters and conferences during our current project. For example, as noted earlier, we have already disseminated the preliminary results of the present investigation in a large variety of sources, such as at the recent annual meetings of ARC (Association pour la recherche au collégial) and APOP (Association des applications pédagogiques de l'ordinateur au postsecondaire), on electronic media such as the home page of la Vitrine APO (Applications Pédagogiques de l'Ordinateur) and Dawson College's Web Support Line, as well as in traditional print resources such as ARC's Actes du colloque and the AQEIPS newsletter l'Hermès. A listing of our dissemination activities during the grant period is available in Table 0.01.

See Table 0.01 in the Appendix

THE PRESENT RESEARCH

Overview in Outline Form

Study 1 - Focus Groups: Students, Service Providers, Professors

- Anglophone and francophone
- 60 participants
- Held in Montréal, Québec (Sainte-Foy), Trois-Rivières
- Cegep students with disabilities
- Cegep personnel responsible for providing services to students with disabilities
- Cegep professors

Study 2 - Questionnaire: Students

- 76 college students with disabilities
- Anglophone and francophone
- Students from large cities and from the regions

Study 3 - Interviews: Service Providers

- 46 cegep personnel responsible for providing services to students with disabilities
- English and French cegeps
- Regular and distance education cegeps
- Cegeps from large cities and the regions

Study 1: Focus Groups With Students, Individuals Responsible For Providing Services To Cegep Students With Disabilities, Professors – Method And Findings

Overview

To obtain an overview of issues and concerns in Study 1 (1999) we conducted a series of unilingual focus groups in Montréal, Québec (Sainte-Foy), and Trois-Rivières. This involved 60 individuals: 21 cegep students with disabilities (9 anglophones and 12 francophones), 25 individuals responsible for providing services to cegep students with disabilities (5 anglophones and 20 francophones), and 14 cegep professors from both arts and science disciplines (7 anglophones and 7 francophones). Separate unilingual groups were held for each of the 3 categories of participants. Anglophone groups were held only in Montréal. Both anglophone and francophone professors were recruited only from the Montréal area. Groups for individuals responsible for providing services to cegep students with disabilities were held only in Montréal and Québec. Originally designed to be strictly focus groups, due to a variety of factors Study 1 ended up being a combination of 9 focus groups, and 11 individual interviews. From these meetings we obtained broad notions about some of the key issues of relevance to the effective use of computer, information and adaptive technologies by postsecondary students with disabilities.

Introduction

The main objective of these focus groups was to collect a broad based, rich and detailed set of data about (1) how the new computer and learning technologies are affecting teaching and learning in the cegeps, especially when it concerns the education of students with disabilities; (2) the experiences of students with computer and adaptive computer technologies - both at home and in the cegeps; and (3) the situation of individuals who are responsible for providing services to cegeps' students with disabilities.

The topic of computer, learning and adaptive computer technologies and students with disabilities in the cegeps is a relatively new area of research. In fact, review of the literature revealed very little empirical research regarding this subject in Québec. Consequently, we felt it was important to understand the issue from a "grass roots" perspective. Morgan (1998) suggests that focus groups can provide clues about how respondents might talk about a new topic, what type of language would be used, etc., enabling researchers to identify items for scale construction. The use of focus groups, as illustrated by Morgan (1988) and Kruger (1994), presents a concrete starting point that can assist in the creation of comprehensive instruments in an area of disability research that seems virtually unexplored. Essentially, our goal was to gather new information on an issue that was relatively unknown to the general public, the researchers themselves and, in some ways, to the parties concerned.

Questions

The data were gathered by drafting sets of questions designed to obtain preliminary information from participants about the use of computer and adaptive computer technologies by students with disabilities in the cegeps. These questions were based on Kruger's (1994) model and were designed along the lines of the five types of questions proposed by the model. However, for the purposes of our research we only used four of the five types:

- Introductory questions: These set the tone of the topics. Aimed at introducing the topics and/or providing the participants an opportunity to reflect on their experiences and their connection to the topics, these questions are also intended to foster interaction among participants.
- Transaction questions: These questions direct the conversation to the main key questions by serving as logical links.
- Key questions: These questions are central to the study. These are the questions that require greatest attention in analysis.
- Ending questions: These questions bring closure to the topics.

We did not have opening questions, which aim at identifying characteristics that the participants have in common because of (1) lack of time, as there were constraints due to the locations and to participants' availability, and (2) many participants already knew each other, and some worked in the same institutions.

Most questions were composed of multiple parts. Some contained parallel questions that allowed participants with different experiences to respond (e.g., users and non-users of computers, service providers versus students). Questions for the three sets of focus group participants are provided in Tables 1.01, 1.02, and 1.03.

See Tables 1.01,1.02, and 1.03 in the Appendix

Participants

This study involved 60 individuals: 21 cegep students with disabilities (9 anglophones and 12 francophones), 25 individuals responsible for providing services to cegep students with disabilities (5 anglophones and 20 francophones), and 14 cegeps professors from both arts and science disciplines (7 anglophones and 7 francophones).

Students (n = 21). The anglophone student focus group consisted of 8 students. One student was interviewed individually which made a total of 9 students (3 females, 6 males). The francophone Montréal area student focus group consisted of 5 students. We also interviewed 1 student individually for a total of 6 students (5 females, 1 male). Both the Québec city and Trois-Rivières francophone student focus groups consisted of 3 students each; there was only one female participant. Of the 21 students, 8 students had visual impairments, 8 had a physical impairment, 2 had a hearing impairment, 2 had learning disabilities, and one was Deaf. Students in these focus groups were enrolled in the following cegep programs: social science, creative arts, business administration, office systems technology, pure and applied science, special education, computer science, social service, nursing, and theatre. Questions asked of students are available in Table 1.01.

Individuals Responsible For Providing Services To Cegep Students With Disabilities (Service Providers: n = 25). Five anglophone individuals responsible for providing services to cegep students with disabilities participated in this focus group (2 females, 3 males). The Montréal francophone service provider focus group included 6 participants (3 females, 3 males). The Québec city francophone service providers, who represent cegeps both in Québec City as well as in the regions, were divided into two focus groups. One group consisted of 6 people (3 females, 3 males) and the other of 8 people (3 females, 5 males). One of the groups included the service provider who coordinates the Québec eastern region's services. Questions asked of service providers are available in Table 1.02.

Professors (n = 14). The anglophone professor focus group consisted of 7 participants (3 females, 4 males). In the francophone sector, 7 professors were interviewed individually (2 females, 5 males). We also interviewed an individual who is heavily involved with implementing the educational uses of the new computer technologies in the cegeps. This individual's data are not included, but his/her comments helped inform the research team about relevant issues. It should be noted that we recruited professors based on two criteria: extensive experience teaching students with disabilities or expertise in the use of computer technologies in cegep classes. Again, we asked individuals responsible for providing services to cegep students with disabilities to recommend professors in these two categories. Professors in the following fields participated: political science, electrical engineering technology, sociology, business administration, computer technologies, civil engineering technology, special education, biology, psychology, social service technology, and literature. Questions asked of professors are available in Table 1.03.

Procedure

Participant recruitment was a multifaceted process accomplished with the assistance of our Advisory Board. In particular, representatives from the Association québécoise des étudiants ayant des incapacités au postsecondaire (AQEIPS) and the Service d'aide à l'intégration des élèves (SAIDE at Cégep du Vieux Montréal) were heavily involved in this process. We prepared invitation packages for students, individuals responsible for providing services to cegep students with disabilities, and professors. Each package consisted of an invitation, an agenda which included the specific questions for each group, as well as a brief article explaining the project. Prepared in consultation with the Advisory Board, all of these items were made available in French and English in both regular print and adapted formats. Thus, this focus group research followed the collaborative approach recommended by Krueger (1994).

Our team contacted individuals responsible for providing services to cegep students with disabilities to help recruit students from their cegep. The same procedure was used to recruit professors; here individuals responsible for providing services to cegep students with disabilities were asked to recommend professors who either had extensive experience teaching students with disabilities or those who were at the cutting edge in using computer technologies in their classes. In Montréal, the service providers were asked to participate as well (in Québec service providers were already attending their annual meeting). In the Montréal area we set up a total of six focus groups, three in English and three in French. These groups consisted of students, individuals responsible for providing services to cegep students with disabilities, and cegep professors. Some service providers and professors could not come at the set time. We therefore conducted individual interviews with one service provider, seven professors, and one resource person, all from French cegeps.

Due to the service providers' time constraints, the person responsible for coordinating Québec eastern region's service providers (le Services aux étudiants handicapés du Cégep de Sainte-Foy) invited us to conduct the service provider focus group during their annual meeting. This included service providers both from Québec's outlying regions as well as those from Québec city. To keep groups relatively small these individuals were divided into two groups, with sessions being conducted concurrently.

After obtaining permission from the participants, focus groups were audiotaped. In addition, at least one note taker was present at the meeting and took notes. To ensure a good verbatim transcript, 2 tape recorders were used whenever possible.

To ensure participant confidentiality we used a numerical coding system based on our attendance sheets (see Morgan, 1988). Only the research team has access to the attendance sheets. The numerical code is used when transcribing the data. To respect the confidentiality of the participants their names as well as the names of the institutions were omitted. Furthermore, using "s/he" in the review protected the gender of the participants. Each group had an animator who read the rules to the group and posed the questions. Verbatim transcripts were prepared for each of the focus groups. These as well as the notes were used to code responses.

Although our intention was to conduct only focus groups, due to unforeseen circumstances the methods of information-gathering had to be expanded. We had scheduled focus groups with approximately equal numbers of participants for each group. Some individuals did not show up at the scheduled time, making it necessary to conduct individual interviews in order to obtain the required number of individuals. This happened in the:

- Montréal francophone students: one student came at a later date with a sign language interpreter
- Montréal anglophone students - a student with a hearing impairment who used the oral method was interviewed later
- Francophone individuals responsible for providing services to cegep students with disabilities - 2 individual interviews were conducted
- Francophone professors - to obtain the information we wanted, we opted to conduct individual interviews

The modifications somewhat compromise the methodology because responses of people who participated in focus groups may have been influenced by intra-group dynamics. This remains one of the unavoidable limitations of Study 1.

As previously mentioned, these focus groups were atypical in comparison to other focus groups utilized for research purposes. This means that, among other things, the participants in each group may or may not have been sharing the same information in their responses to the questions. Also, each participant had a different characteristic. For example, students with different impairments experienced different obstacles using the technologies. In the case of individuals responsible for providing services to cegep students with disabilities, some were full-time service providers while others performed this job in addition to having other cegep-wide responsibilities. However, the main objective here was to obtain a broader perspective of the situation in Québec. These focus groups allowed us to accomplish this task.

We set up four focus groups with the intent of gathering information about experiences of students with disabilities in the area of computer and adaptive computer technologies. Regarding confidentiality, we informed participants that we would be audiotaping the proceedings and assured them that all information shared with us would remain confidential and be used only for the purposes of this project. To obtain this information, the animator asked a series of questions and gave the participants a set time in which to answer each. After the question period, we broadened the discussion into a “free for all” where participants were given the opportunity to share other experiences or ask questions of their own. Each group session lasted approximately two hours.

All anglophone focus groups were held at Dawson College. The Montréal based francophone focus groups were held at Cégep du Vieux Montréal. The Trois-Rivières student focus group was held at Cégep de Trois-Rivières. In Québec we held the student focus group as well as both service provider focus groups at Cégep de Sainte-Foy.

Coding and Categorization

The notes and verbatim transcripts from the sessions were read and categories were developed. An attempt was made to keep the meaning intact. However, possible misinterpretation of participants' statements may have occurred in the categorizing process. This is an inherent limitation in this type of data gathering.

The review of the focus group data is presented as follows. Two research team members examined and coded the responses for all questions. Groups were divided between two research team members, so that one member had primary responsibility for some groups while the other had primary responsibility for the remaining groups. After individual coding was completed coding was reviewed collaboratively. Following Morgan (1988), interpretation of responses was kept to a minimum.

Each focus group was considered separately. To organize the responses we followed the focus group questions. Therefore, categories are not necessarily the same in each of the four groups. Under each category we added responses as voiced by the participants. The only changes made were in spelling and punctuation. If additional comments made by the participants were thought relevant, they were included in the discussion sections. For the most part, we reserved our personal observations for the Discussion Section in which we summarize the findings.

The data within each focus group needs to be reviewed one question at a time by subcategories. It is to be noted that categories were chosen partly based on the questions. For example, data from questions on advantages and disadvantages of computer technologies were sub-categorized as such.

Each focus group's questions were classified into categories and, where appropriate, into sub-categories. Then, a brief comparison of the focus group's responses about the uses and availability of computer and learning technologies was made from the perspective of students with disabilities, professors, and individuals providing disability related services to students. We also tried to look for spontaneously emerging similarities and differences by linguistic group as well as by geographic location.

Each group provided and represented unique perspectives. Here we try to present their concerns as accurately as possible. For instance, our interpretations were clearly identified as "paraphrases", "summaries", or "comments". Issues of each group presented in the Results section resurface in the Discussion. Moreover, in an attempt to validate the views reported by participants we sought to develop a model by researching the actual realities and integrating these into the discussion (e.g., finding out about current policies and application procedures to government programs which assist students in obtaining computer technologies). In addition, we attempted to respect participants' statements by according them the predominant voice in the review and by transcribing the comments in participants' original language (English or French) and grammatical form.

Limitations. Because some of the data were not obtained according to the original methodology (i.e., in several instances we conducted individual interviews) there is a different response dynamic apparent in some of the comments. As Morgan (1988) points out, it is possible to link focus group data to individual interviews. Because we did not plan to conduct individual interviews initially, our analysis shows the limitations of our original approach. The data obtained from individual interviews is presented in the same format as the focus group data, even though the information is much more detailed. In addition, observational details that could have been taken into account during the focus groups was not. It seems that our review method is consistent with the approach to focus groups as qualitative research (Morgan 1988) and, therefore, the data are appropriate to obtain preliminary information about the use of computer and information technologies by students with disabilities in the cegeps.

Although we obtained feedback about the questions from members of our Advisory Board, there were only a limited number of research team members who actually belonged to the populations studied in the focus groups. For example, although there are people with disabilities on the team that prepared the questions, only two are currently students. In addition, there was only one individual responsible for providing services to cegep students with disabilities and only one cegep professor who participated in the preparation of the questions. This may have limited our perspective

We wanted to include a wide range of possible participants (e.g., students who are users and nonusers of computer technologies, professors with different experiences with students with disabilities and different types of experiences using the new computer and learning technologies in the classroom). As a result, our questions may have had too many components, explaining why some parts of questions were not answered.

The Discussion section, which contains parts of summaries from the various focus groups, is used to show similarities and differences between groups of participants. The key questions from each group will be the focal point of the summaries. Krueger's principle of focus group analysis suggests that analysis should seek to enlighten or bring alternative explanations to the query arising from a focus group (1994). We will use Fougeyrollas et al.'s (1999) PPH model (Processus de production du handicap / Disability Creation Process) as the primary analytical tool, but the social model of disabilities (Oliver 1990, 1996) as well as the economic model (Bickenbach, 1993) will be used to support our conclusions.

Results: Study 1

This section contains participants' responses to the focus group questions. These are not "ethnographic" (cf., Morgan, 1988) in their totality. However, by keeping them in their original language and by using paraphrasing only for clarification we retain our objective of using as many of participants' original quotations as possible. Thus, we maintain something of the spirit of the ethnographic approach.

The presentation is as follows. We present the questions in French and English in a box. Sub-sections of each question are called articles – these appear in bold. Sometimes this part of the question is the major and only category. At other times, articles have sub-categories. Items preceded by letters are participants' utterances. For the purpose of clarity, some of these participants' utterances are paraphrased. We indicated this wherever it occurs. Our comments, which introduce or clarify utterances, are either at the beginning or end of a section. Responses were kept in their original language, while paraphrased utterances may be in French or English.

"Designated institutions" refers to one of Québec's various rehabilitation or specialized centers and "parc informatique" refers to a computer lab: l'ensemble d'installations, d'équipements matériels et de logiciels informatiques dont dispose un établissement d'enseignement.

Student Focus Group Data Summary

All participants were asked the same 5 questions, most containing several parts. This allowed people with different experiences to respond accordingly. The uneven number of responses is due to the fact that not all participants responded to all parts of each question; they did not respond either because the question was not relevant to them or they chose not to respond.

Student Question (1)

Utilisez-vous un ordinateur? Si oui, de quel type? Utilisez-vous certaines adaptations ou avez-vous fait des modifications à votre ordinateur qui lui permettrait de mieux répondre à vos besoins? Si non, pourquoi pas? Ne pas utiliser d'ordinateur vous cause-t-il des problèmes? Prévoyez-vous utiliser un ordinateur dans un proche avenir ?

Do you use a computer? If yes, what kind is it? Do you use any adaptations for your computer or have you made any modifications to it to make it better meet your needs? If no, why not? Does it cause problems for you that you do not use a computer? Do you foresee using a computer in the near future?

1.1 Student (Article 1.1) Utilisez-vous un ordinateur? Si oui, de quel type? / *Do you use a computer? If yes, what kind is it?*

Student Article1.1.1 **Brand of computer**

Summary: In the 4 focus groups, all students were computer users. However, they seemed to have different brands with different capabilities, showing that students with disabilities use a range of computer types, not any one brand, of either hardware or software.

a. Students responded by giving the brand of computer, such as: "Pentium, 486."
b. Others told us the type, such as: "Portatif, pour (mon) programme c'est nécessaire."
c. "I use an IBM."
d. Paraphrase: Pentiums of all levels, IBM, and IBM compatibles were mentioned 11 times by students in all 4 student focus groups.
e. Paraphrase: One student said s/he used a Mac and another said a Power Mac. Both were students attending English-speaking cegeps.

Student Article 1.1.2 **Non-specified brand**

a. "Bon, pour répondre à la question que je viens, que tu as posé là, moi... Je me sers des ordinateurs comme tel."
b. "Moi, j'utilise des ordinateurs, pour être précis là, j'en ai deux là."
c. Paraphrase: Others made comments regarding the usefulness of their systems: "I have a computer at home that was provided by the designated rehabilitation center. It's a 386 and not powerful enough."
d. Paraphrase: The 2 students who use Mac said that: "they're user-friendlier, and they're not always crashing and stuff."

1.2 Student (Article 1.2) Utilisez-vous certaines adaptations ou avez-vous fait des modifications à votre ordinateur qui lui permettraient de mieux répondre à vos besoins? Si non, pourquoi pas? / *Do you use any adaptations for your computer or have you made any modifications to it to make it better meet your needs?*

Student Article 1.2.1 **No adaptation**

Summary: 6 students in all 4 focus groups, said that they had no need for computer adaptations at this time.

a. "Je n'ai pas d'ordinateur adapté à ma surdité en ce moment."
b. One added that "peut-être parce que j'en connais pas."
c. "Moi ça va, je l'utilise comme tel. Les ordinateurs du cégep et celui que j'ai à la maison sont utilisés comme tel, je les utilise comme ça, pas d'adaptations."

Student Article 1.2.2 **Adaptive technologies**

Comments: Some students were very specific in mentioning adaptive programs that they use. For example:

a. "J'ai un clavier collé sur la table avec des velcros. J'ai eu l'ordinateur à l'aide du gouvernement; l'adaptateur avec des trous (au-dessus du clavier)."
b. Paraphrase: Another student spoke of having "AOL" (program that works like a TTD allowing two people with the same system to communicate without needing the extra TTD machine).
c. Paraphrase: Screen enlargement software was mentioned most often by students with visual impairments.
d. ZoomText: "J'ai LP DOS (programme d'agrandissement), mais j'ai un gros moniteur aussi. Je ne peux pas faire d'adaptations parce qu'il n'est pas assez puissant."
e. "Là j'utilise un logiciel de grossissement pour aller, par exemple, sur internet."
f. "Mon ordinateur, c'est juste un programme que j'ai rajouté là qui grossit l'affichage de l'ordinateur."
g. Large print on screen, Adaptive Express synthesizer, latest version of JAWS for Windows

h. Paraphrase: 3 students mentioned scanners with different programs: Arkenstone, Open Book, OmniPage
i. Paraphrase: CloseView to view screen CCTV, ClarisWorks, Artic Transport for DOS, JAWS (control over format with DOS), DecTalk Express, OCR (Textbridge Pro), Dragon Speak (helps with CCTV), Enlarging adaptation program (Pixels)

Student Article 1.2.3 **Others spoke of software and hardware**

a. "Qui est adapté en Braille, c'est un portatif que je peux amener dans mes cours, prendre les notes, faire mes travaux puis toutes ces choses-là."

Summary: Mainstream programs which could be used as adaptations were mentioned by students.

b. Windows based programs: Windows '95, Windows '98, Microsoft '98
c. Word processors: WordPerfect for Windows, Notepad, "use all the applications," Word, Word '97, Corel
d. Web browsers: Netscape Communicator, Explorer, "internet," "use computer to input stuff," Webpage Editor, Windows (e.g., dialer, internet)
e. DOS programs: WordPerfect for DOS

Comments: As all students were computer users, questions aimed at non-computer users were not relevant.

Student Article 1.2.4 **Issues of ergonomics and furniture in the classroom**

a. "Dans tous mes cours, il y a des cours où tu t'assois et soit la table est trop haute ou qu'elle est trop basse... ou des chaises qui sont attachées, que t'es obligé de taper de même (nez collé à l'écran) puis après trois heures, t'as mal au dos."
b. "Nécessairement, dans les auditoriums c'est encore pire, parce qu'effectivement les tables sont vraiment basses et les chaises, c'est toutes des chaises moulées en plastique que c'est complètement inadéquat pour mon portable. Pour les élèves qui écrivent à la main, oui, mais surtout un portable."

Comments: 2 other students made reference to this problem when asked about other issues.

Student Article 1.2.5 **Problems encountered: software and hardware**

a. "When I get frustrated on Windows, I switch to DOS. WordPerfect 6.0 for DOS."
b. "(I had) upgraded RAM on (the) computer because (the) screen-enlarging program needs more RAM."
c. Paraphrase: One student outlined the differences between the major types of computers in regard to specific needs: "Mac is visual, so you (might) need some vision and voice programs (that) aren't good on the Mac."
d. 2 students indicated that having the on/off switch at the back of the screen is a problem for someone who uses a wheelchair.

Student Article 1.2.6 **Others made reference to what they might eventually want**

a. "...mais je sais qu'il existe des programmes par la voix. Peut-être qu'éventuellement, je vais devoir l'utiliser, mais pour l'instant, ce n'est pas nécessaire."
b. "Qu'est–ce que j'aurais besoin de plus, c'est de la vitesse là, mais c'est commencer à être chialeur(euse)."
c. Comments: Other issues mentioned were high prices, that government programs are limited, the lengthy delays before receiving support from programs, and the programs' control over the choice of hardware.

Student Question (2)

Si vous utilisez un ordinateur, comment avez-vous appris à l'utiliser? Comment cela a-t-il fonctionné pour vous? Y aurait-il une autre façon d'apprendre qui vous aurait été utile? Si vous n'utilisez pas un ordinateur, est-ce que l'apprentissage de son fonctionnement était une préoccupation pour vous? Comment? Si vous utilisez un ordinateur, comment avez-vous appris à l'utiliser?

If you use a computer, how did you learn to use it? Did this work well for you? Is there some other way of learning that would have been helpful? If you don't use a computer, was learning to use it an issue for you? How so?

2.1 Student (Article 2.1) Si vous utilisez un ordinateur, comment avez-vous appris à l'utiliser? / *If you use a computer, how did you learn to use it?*

Student Article 2.1.1 **On their own**

Summary: Of the 21 students, 19 stated they learned at least in part on their own.

a. "Most of the things I learned are self-taught on computers."
b. Comments: The ways of learning on their own included: "en explorant," "seul," "essais-erreurs," "en travaillant pour (mon) frère," "livre."

Student Article 2.1.2 **Informal training from friends, professors, or others**

a. "Depuis que je suis toute petit(e), j'ai eu des informations qui m'ont été données par mon père. Depuis l'âge de six ans, je me suis habituée à utiliser un ordinateur. Alors mon père, il est très patient avec moi, il m'a montré patiemment chaque jour. Comment ça fonctionne? Ben oui, je l'ai su par mon père."
b. "Que quand j'ai de la difficulté, j'appelle une personne qui connaît ma façon de fonctionner, ma capacité de comprendre."
c. "...puis je me débrouille..."
d. Paraphrase: Il(elle) a eu un cours au secondaire (avec) des explications.
e. "Not really. But there's no one out there to teach us."
f. "A friend taught me how to use the computer and it worked well. Didn't learn any other way."
g. "Fait que j'ai commencé à apprendre comme ça, puis après ça j'ai commencé à suivre la technologie."
h. "...jamais eu cours..."

Student Article 2.1.3 **Courses**

a. "...il faut que je suive au pire, j'ai suivi quelque cours aussi qui pouvaient aider là."
b. "In grade 6, the principal of my school suggested we use a Mac with an enlarging program."

Comments: A few participants mentioned a designated rehabilitation center. These are usually centers that provide services for people with specific impairments. For example, students who are blind would go to specific rehabilitation centers. These centers were mentioned primarily by students with visual impairments.

c. "Le mini-cours au secondaire a fonctionné assez bien. Juste des notions de base."

Student Article 2.1.4 **Designated rehabilitation center**

a. "Most of the things I learned are self-taught on computers. I had some training at the (designated institution) (in) speech software, speech synthesizer, and word processors."
b. "Aide du (Centre désigné de réadaptation)."

c. "Cela a bien été parce que (le Centre désigné de réadaptation) connaît mes besoins. J'ai appris comment utiliser LP DOS, Windows, etc. Mais c'est le strict minimum, comment travailler, mais juste sur un programme."

2.2 Student (Article 2.2) Comment cela a-t-il fonctionné pour vous? / *Did this work well for you?*

Student Article 2.2.1 **Technology or impairment-related problems**

a. Paraphrase: A des problèmes de dextérité des doigts, donc moins vite que les autres.
b. Paraphrase: 3D-compliqué mais il(elle) serait capable.
c. Paraphrase: Il ne faut pas (de) bourrage de crâne.
d. Paraphrase: Il faut revoir plusieurs fois.

Student Article 2.2.2 **Assistance requested and obtained**

a. "Le mini-cours au secondaire a fonctionné assez bien. Juste des notions de base, comment travailler, mais juste sur un programme."
b. "Mon père aussi m'a appris, mais j'aimerais apprendre Excel. Pas le choix d'apprendre qu'en travaillant dessus. Quand j'ai besoin d'aide, je demande."
c. "Non, ça, ça a bien été. Moi là, il y a des fois que je consultais du monde ou c'est ça, moi c'est des contenus."

Student Article 2.2.3 **Some identified difficulties**

a. Paraphrase: At the (designated rehabilitation center), they just teach the basics. The methods of learning were efficient.
b. Paraphrase: "I'm satisfied with the trainer but..." This student showed some reservation about the training.
c. "(...)des fois, il faut demander aux autres..."
d. Paraphrase: Regarding satisfation one student said: "Not really. But there's no one out there to teach us."
e. "There's nobody out there to teach Mac."

2.3 Student (Article 2.3) Y aurait-il une autre façon d'apprendre qui vous aurait été utile? / *Is there some other way of learning that would have been helpful?*

Comments: With regard to other ways of learning in both the anglophone and francophone focus groups, in both the cities and regions, cegep students' responses were consistent: either they did not respond or they were specific.

a. "Je sais qu'au (Centre désigné de réadaptation) il y a des services qui sont offerts aux personnes sourdes, par exemple on offre des formations à l'internet, des formations à tout ce qui est ordinateur, je n'ai jamais participé vraiment mais je sais que c'est offert."

Student Article 2.3.1 **Other responses**

a. Paraphrase: Faudrait avoir un cours pratique, un professeur de Word, un cours, une démonstration, explorer et répéter par soi-même, un contact tôt (ce qui donnerai une base), quelqu'un de disponible pour soi.
b. "Une autre façon d'apprendre, avoir un peu plus de temps, un prof à temps plein pour une semaine ou deux."
c. "J'aimerais avoir des cours brefs parce que je fatigue facilement. J'aimerais apprendre plus de traitement de textes et l'internet, et peut-être savoir comment le réparer: Ça prend trois semaines le faire réparer, entre temps, je ne peux pas faire mes travaux scolaires."
d. "The problem with adaptive technology is that, for example, with JAWS there are so many things you have to know that it's hard and time consuming."
e. "I have more trouble with Windows 95. I prefer Mac (user-friendly) but adaptive technology doesn't work on it."

Student Question (3)

Si vous utilisez un ordinateur à la maison, comment l'avez-vous obtenu? Avez-vous eu recours à un programme de subventions? (Si oui, quel(s) programme(s), comment cela a-t-il fonctionné pour vous, que pensez-vous de ce programme?) Si vous n'avez pas eu recours à un programme de subventions, pourquoi pas? Sinon, étiez-vous au courant de la disponibilité de programmes de subventions pour vous? Si oui, pourquoi vous n'y avez pas eu recours?

If you use a computer at home, how did you acquire it? Did you use a subsidy program to obtain your equipment? (If yes, what program(s), how well did the program work for you, what do you think about the program?) If you did not use a subsidy program, why not? If you don't use a computer at home, were you aware of subsidy programs that are available to you? If yes, why did you not use this?

3.1 Student (Article 3.1) Si vous utilisez un ordinateur à la maison, comment l'avez-vous obtenu? / *If you use a computer at home, how did you acquire it?*

Summary: Among the 21 students who participated in all focus groups, 12 students, both French and English, stated that they bought at least one of their home computers themselves with assistance from either family or friends. Reasons for this varied. Only 6 students used subsidy programs. Those who purchased a second computer or components, did so on their own.

Student Article 3.1.1 **Partial ownership**

Summary: Others indicated that a family member or friends either owned the equipment or had bought it for them.

a. "My father bought me a laptop."
b. "I asked my aunt for a loan to buy a computer because I've heard too many bad stories about subsidy programs."
c. "When I entered high school, my parent bought me a desktop computer for home."
d. "Puis j'en ai un autre (ordinateur) chez moi que je me suis payé..."
e. "Moi, j'ai eu un ordinateur, chez nous, il y a une couple d'années, parce que mon frère étudiait ici, il avait besoin d'un certain programme pour travailler à la maison, donc mes parents ont acheté un ordinateur."

Student Article 3.1.2 **Bought it themselves**

a. "L'ordinateur que j'ai à la maison, c'est moi-même qui l'ai acheté là."
b. "Ben parce que moi je l'avais acheté (il y a) quelques années."
c. "I got a loan at a bank and bought my own computer."
d. "I bought my computer on my own."
e. "I got my Mac four years ago on my own and I find it works better getting it myself."

Student Article 3.1.3 **Government-related sources**

a. Paraphrase: Par la Commission scolaire (du secondaire) et par lui(elle)-même après quoi le gouvernement l'a remboursé.
b. "...programme du ministère de l'Éducation..."

Summary: Of the 4 students, who mentioned having used the government program, 3 mentioned the designated rehabilitation center. All 3 were designated rehabilitation centers for people with visual impairments. Acquiring a computer for home use without any other sources was mentioned by 2 students.

Student Article 3.1.4 **Designated institutions**

Summary: Participants mentioned government programs or agencies, or designated rehabilitation centers servicing specific impairment groups, i.e. people who are blind, people who are deaf, etc.

a. "I applied at the (designated rehabilitation center) for a laptop and it took a year."
b. "Je l'ai eu du (Centre désigné de réadaptation) et du programme gouvernemental."

Student Article 3.1.5 **Second computer**

Summary: Out of 6 students, 3 responded that their first computer was purchased with subsidies from either a governement program or a designated rehabilitation center. 3 students added that either another program or a family member bought their second computer or helped with part of the updating.

a. "...deuxième par programme gouvernemental..."
b. Another student said: "le deuxième, mon père l'a payé."
c. "Le premier (...) et le deuxième, (par des) programmes gouvernementaux."
d. Paraphrase: For the most part, the students informed us that the second computer was needed because the first was no longer appropriate or was not functioning.

3.2 Student (Article 3.2) Avez-vous eu recours à un programme de subventions? (Si oui, quel(s) programme(s) ? / *Did you use a subsidy program to obtain your equipment? (If yes, what program(s)?*

Student Article 3.2.1 **Programme de subventions**

Summary: In the English group, 5 students did not respond. In the French groups, 8 did not respond. Some students named the institutions that provided them with the computers, whereas others cited government programs or private sources.

a. Paraphrase: Some of the government sources, such as RAMQ (Régie de l'assurance maladie du Québec), were cited by 2 students. L'OPHQ (Office des personnes handicapées du Québec) was also mentioned by 3 students and from "des subventions (privées comme l') OTAN."
b. "Le premier, le tout premier que j'ai eu, c'est un IBM, un 386, ça c'était des dons des employés des ICA, ICI Canada, ça c'est mon père qui travaille là."
c. Paraphrase: Some PC stores offered PCs to students in specialized academic programs.

Student Article 3.2.2 **Qualifying remarks by students**

a. "The designated rehabilitation center gave me a computer, but they give you what they think you need, not what you need."
b. "My first computer was a laptop from the (designated rehabilitation center)."
c. "I applied at the designated rehabilitation center for a laptop and it took a year."
d. "Le deuxième, moi, mon père et mes frères, on se l'est payé. On n'a pas eu recours au gouvernement."
e. Paraphrase: The interviewer restated the quotation since participant had a speech-impairment: "OK, c'est ta mère qui a fait les démarches. Puis finalement les ordinateurs, c'est le Fonds universitaire qui a payé l'ordinateur."
f. Paraphrase: Students that opted to ask family for assistance to get a loan explained, "I've heard too many bad stories about subsidy programs."
g. "Ça a pris un bon deux mois pour l'avoir..."

3.3 Student (Article 3.3) Comment cela a-t-il fonctionné pour vous? / *How well did the program work for you?*

Comments: Few students answered this question, since only a few used these programs. Students' responses are grouped into 3 categories. These responses were primarily from French-speaking students.

Student Article 3.3.1 **How they found ways of getting what they needed**

a. Paraphrase: Il(elle) a eu neurologue chez lui(elle) car il(elle) avait des contacts. Puisqu'il(elle) avait l'argent avant qu'il(elle) en reçoive du gouvernement, il(elle) a acheté lui(elle)-même l'ordinateur. Il(elle) a agit au meilleur de ses connaissances. Il(elle) a fait remplir le formulaire par son intervenante.

Student Article 3.3.2 **N'ont pas utilisé le programme**

a. "...(il) faut se débrouiller, (il) faut répondre aux exigences (du programme)..."
b. "...(mes) parents l'a acheté..."
f. "...(il(elle)) s'organise sans aide..."

Student Article 3.3.3 **Peu de problèmes:**

a. "Bien."
b. "Délais (sont) raisonnables."
c. "(Il(elle) n'a) pas à se plaindre."
d. "(Il(elle)) ne sais pas (c'est trop loin)."

3.4 Student (Article 3.4) Que pensez-vous de ce programme? / *what do you think about the program?*

Comments: Students who did not use the program also responded to this section. Students' views about the programs could be grouped under in the following categories:

Student Article 3.4.1 **Some seem happy with the program**

a. "Les processus n'étaient pas longs."
b. "Satisfait."
c. "Bien car (ce n'est) pas tout parent capable de s'en payer un."
d. "...(ça) facilite la tâche..."

Student Article 3.4.2 **Problems identified with programs were**

Student Article 3.4.2.1 **Qualifying for programs**

a. "Le plus difficile est le rendez-vous avec le spécialiste. Il(elle) avait des 'plugs'. Le processus a donc été plus rapide."
b. "...it took seven months to get my first laptop."
c. "I looked at the subsidy program and I couldn't be bothered with it, it's too complicated. I didn't complete the forms..."

Student Article 3.4.2.2 **Restriction of what is allowed by programs**

a. Paraphrase: Un(e) étudiant(e) a mentionné(e) que c'était une dépense inutile car les programmes ne donnent pas de disque dur.
b. "They don't let you choose what you want or need. They don't know how I see."
c. "I was discouraged because the subsidy program chooses what programs I need. I have no say."

Student Article 3.4.2.3 **Time: took too long**

a. "It took seven months to get my first laptop. They should offer choice within certain boundaries."

Student Article 3.4.3 **Suggestions to government regarding program**

a. Paraphrase: Certain(e)s étudiant(e)s ont suggéré(e)s que le gouvernement envoie un spécialiste.
b. "They (the program) should offer choice within certain boundaries."

3.5 Student (Article3.5) Si vous n'avez pas eu recours à un programme de subventions, pourquoi pas? / *If you did not use a subsidy program, why not?*

Summary: Students gave various reasons for not requesting grants.

Student Article 3.5.1 **Problems with criteria**

a. Paraphrase: At least 2 students mentioned that according to program guidelines they were not handicapped enough to get a subsidy for the moment.
b. "Assez fonctionnel(elle) (physiquemment) alors il(elle) n'a pas le droit."

Summary: D'autres étudiant(e)s ont mentionné(e)s que le problème est relié au revenu des parents:

a. Paraphrase: Il(elle) était (très) insatisfait(e) parce que le programme fonctionne à partir des salaires de parents.
b. "I didn't even look at subsidy programs (because) my father makes a lot of money but won't give me any."
c. Paraphrase: Un(e) étudiant(e) a expliqué(e) que les règlements ne lui permettent pas d'être admissible aux bourses "à cause que mes parents avaient un salaire." Or, il(elle) conclut qu'il ne faudrait pas se fier au salaire des parents. L'étudiant(e) explique que "dans le fond, c'est pas vrai que mes parents ils étaient capables d'acheter un ordinateur pour moi là, mais en tout cas, il n'est pas valable, parce que oui, ils doivent subvenir à mes besoins, mais d'un autre sens, ils n'ont pas vraiment le choix, je ne peux pas m'en aller là. Fait que je trouve que ce n'est pas correct que ce soit eux autres qui aient à payer pour ça, parce que ce n'est pas de leur faute si je ne peux pas m'en aller, tu sais."

Summary: Certain(e)s étudiant(e)s ne comprennent pas ou ne sont pas d'accord avec les programmes qui prennent en considération, dans le calcul des bourses, le salaire des parents alors que la demande est faite pour l'étudiant(e).

a. "Quand l'autre étudiant(e) disait qu'il(elle) avait eu un problème, ils ont refusé sa demande par rapport au revenu; moi j'ai eu une demande, j'ai été accepté(e), puis dans tous les papiers, ils (me) demandaient le médecin, mon baptistaire, la preuve que j'étudiais, j'avais un papier du cégep, un formulaire, mais jamais, dans tout le questionnaire qu'ils m'ont passé qui demandaient une référence au revenu de (mes) parents. Ce que je ne comprends pas (c'est) qu'ils t'ont refusée pour ça. Soit qu'ils ont inventé une excuse pour refuser, mais je ne vois vraiment pas le rapport, parce que ça pas rapport, t'as fait une demande pas par rapport à une bourse étudiante, tu demandes un prêt par rapport à ta déficience."
b. "Je ne suis pas d'accord avec (le calcul en fonction des parents)."
c. "Le programme gouvernemental, ils n'ont jamais demandé le revenu de mes parents, c'est quoi le rapport, je demande leur aide par rapport à mon handicap, je ne te demande pas une bourse pour vivre, je te demande un équipement par rapport à ma maladie. Fait que c'est sûr que je ne comprends pas la question du revenu."
d. "J'aimerais dire à eux autres de s'essayer, faire des démarches, d'aller voir son responsable au cégep."
e. "Le programme gouvernemental ne voulait pas payer l'ordinateur parce qu'ils disaient que j'en avais pas assez besoin."

Student Article 3.5.2 **Not aware of programs**

Summary: Of the 21 students, 4 students reported that they were not aware of the existence of subsidy programs. The following 2 students echo similar sentiments.

a. "Je ne savais pas qu'il y avait des subventions."
b. "Je n'ai pas d'informations, je n'ai pas été informé de ça, je ne pourrais pas te dire."
c. "Puis ... s'il y a des subventions qui existaient là, je suis, je ne suis pas au courant."

Comments: The above comments were primarily from French speaking cegeps.

Student Article 3.5.3 **Process took too long**

a. "I got my computer in (a) month-and-a-half doing it myself. I didn't even look at subsidy programs. My father makes a lot of money but won't give me any."

b. "I looked at the subsidy program and I couldn't be bothered with it, it's too complicated."

c. "I didn't complete the forms, because I was discouraged because the subsidy program chooses what programs I need, I have no say. They don't let you choose what you want or need (they don't know how I see)."

Student Article 3.5.4 **Limitations of programs**

Summary: Some students felt that the programs limited them in getting only pre-established products that may not correspond to their need.

a. "I didn't use subsidy programs because they're only available through institutions like the (designated rehabilitation center) and I wanted control over what computer I want."

b. "I find it works better getting it myself. Besides, you always feel that you've got it lent to you, it's not yours."

c. "C'était facile d'avoir l'ordinateur, mais il y a beaucoup de formalités."

d. Paraphrase: There's a program, it is limited to what equipment you can get. I wish I had a note-taker, a note device that I can take to class instead of my laptop that will only enable me to take notes. You know like Braille'nSpeak. Those kinds of technologies. But I'm unable to get that because of the different rules and restrictions that they have. That's pretty much all that I have to say.

3.6 Student (Article 3.6) Si vous n'utilisez pas un ordinateur à la maison, étiez-vous au courant de la disponibilité de programmes de subventions pour vous? / *If you don't use a computer at home, were you aware of subsidy programs that are available to you?*

a. "The second program I had, they (...) didn't want to pay for it."

b. "I went to the (designated rehabilitation center) to ask about programs, I wanted more memory, but the process was so complicated and long (time is money)."

c. "Mais je ne sais pas, c'est ma mère qui a fait affaire avec ça."

3.7 Si oui, pourquoi, vous n'y avez pas eu recours? / *If yes, why did you not use this?*

a. "...je m'organise sans aide."

b. Paraphrase: Si nécessaire, il(elle) y aurait eu recours.

c. "Je sais qu'on a des services par exemple au niveau des téléphones pour personnes sourdes mais au niveau des ordinateurs, non, ça ne m'a jamais traversé l'esprit. L'idée de pouvoir avoir accès à un programme gouvernemental ça ne m'a jamais traversé l'esprit."

Student Question (4)

Utilisez-vous un ordinateur à l'école? Si oui, où l'utilisez-vous? Si non, pourquoi pas? Comment cela fonctionne-t-il pour vous? Ne pas utiliser d'ordinateur à l'école vous cause-t-il des problèmes?

Do you use a computer at school? If yes, where do you use it? How well does this work for you? If no, why not? Does it cause problems for you that you do not use a computer at school?

4.1 Student (Article 4.1) Utilisez-vous un ordinateur à l'école? Si oui, où l'utilisez-vous? / *Do you use a computer at school? If yes, where do you use it?*

Summary: All students in both the English and French focus groups were computer users and all used computers at school.

Student Article 4.1.1 **Mainstream computer labs**

a. "I use the network mainframe to do exams."
b. "There are six computer labs with an adjustable table per room."
c. "I use computers in cegep. In my career program, we have to use computers."
d. "Cegeps... they're fine with word-processing programs for everyone."
e. "I use school computers to write tests."

Student Article 4.1.2 **Others had their own computers**

a. "Oui, (portatif) dans les cours d'informatique."
b. "Fait que moi, je pense j'en ai parlé un peu tout à l'heure, c'est un portable."
c. "Un, comme un afficheur Braille que je transporte dans mes cours."
d. "Ça fonctionne c'est que c'est un ordinateur portable, puis il y a un appareil de connecté sur cet ordinateur-là qui reproduit en Braille l'affichage de l'ordinateur."

Student Article 4.1.3 **Equipment in decentralized areas : Specialized adapted computer lab/office for students with disabilities**

a. "Alors moi je m'en sers, pour l'école, à la bibliothèque."
b. Paraphrase: SAIDE's (Service d'aide à l'intégration des étudiants) office was also mentioned by one student.
c. "(J'ai un portable) que je traîne, puis que je prenne mes notes (...) puis dans, dans le local j'ai des appareils qui ne sont pas transportables là."
d. "Quand j'ai des laboratoires ou des examens à faire, je m'en vais dans ce local-là, puis avec les autres appareils qui me permettent entre autres de lire les documents que le professeur nous donne puis ces choses-là... j'arrive à faire, comme exemple, mes examens. Puis après ça, j'utilise mon portable pour écrire, écrire mes réponses."
e. "À l'école, je peux aller à la salle d'ordinateur. J'utilise à la maison, dans un cas exceptionnel, je peux utiliser la salle d'informatique. La chaise rentre, c'est bien adapté."

4.2 Student (Article 4.2) Comment cela fonctionne-t-il pour vous? / *How well does this work for you? If no, why not?*

Student Article 4.2.1 **Problems with physical environment**

a. Paraphrase: Problème position d'écriture avec certaines tables, les ordinateur fixes sont mieux (ordinateur de table), il(elle) doit déplacer l'écran à l'avant, les ordinateurs sont lents.

Student Article 4.2.2 **Technological problem**

a. "OK. Pour le fonctionnement, je peux dire j'en arrache des bouts là! Parce que je suis tellement... tu sais avec ta souris, il faut que tu cherches, à savoir si tu es à la bonne place ou pas. C'est à peu près ce que je trouve le plus 'tough'."
b. Paraphrase: One student explained that s/he did not have the same type of mouse at home.
c. "Oui, mais, je vais le dire ben franchement, ils vont mal. Ben moi, j'imprime mes travaux à l'école, j'ai un petit local là, ça c'est la connexion que je prends n'est jamais là, pour brancher l'imprimante après mon portable."

Student Article 4.2.2.1 **Organization of school computers and problems**

a. "Our cegep is not organized. Part of the problem is that Student Services and Learning Center are merged. Scanners are hard to find at school."

b. Paraphrase: One student said that there are problems with not having enough computers at the cegep: "But I've never had problems for exams; adaptive equipment has always been available."
c. "There's a table that can be raised, but other students take my spot and I have to fight with teachers to get students to move so I can use the table. Some people move but most don't."
d. "Some teachers won't let me have extra lab time."
e. Paraphrase: "Il(elle) a à attendre pour imprimer, alors le professeur l'accuse de tricher. De plus, ce n'est pas tout les professeurs qui sont calés en informatique."
f. Paraphrase: Un(e) étudiant(e) a un casier spécial pour entreposer ses effets personnels.

Student Article 4.2.2.2 **Happy with the way technology works**
a. Paraphrase: Lab ouvert à tous. Ça fonctionne bien.
b. "The computers suited my needs."
c. Paraphrase: Il(elle) utilise un ordinateur pour ses examens.
d. "The computers suited my needs."
e. "Bon je dirais ce qui fonctionne bien pour moi, c'est d'avoir un ordinateur qui est à jour avec les deux choses que j'aurais besoin Word '98, puis Excel, puis ces affaires là."
f. "Moi ce qui fonctionne bien, c'est le fait que j'aie un moniteur agrandi là (.....), ça va bien dans le sens là, que j'aie pu l'apprendre, puis que ça fonctionne bien, que je vois bien, ça je trouve que c'est génial qu'on ait permis, même si c'est pas renouvelé."
g. Paraphrase: Puisqu'il(elle) est assez rapide sur ordinateur, plus qu'à la main et c'est moins fatiguant.

4.3 Student (Article 4.3) Si non, pourquoi pas? / *If no, why not?*

a. Un(e) étudiant(e) nous dis qu'il(elle) "(n)' utilise pas ordinateur a l'école"
b. Paraphrase: Other responses included information that students use sign language interpreters.

4.4 Student (Article 4.4) Ne pas utiliser d'ordinateur à l'école vous cause-t-il des problèmes? / *Does it cause problems for you that you do not use a computer at school?*

Student Article 4.4.1 **How computers create barriers**
a. Paraphrase: Some students stated that computers do not cause barriers.
b. "They find using computers difficult."
c. Paraphrase: L'ordinateur la ralentirait.
d. "Je ne l'utilise pas à l'école. Pour les examens, je réussis à finir dans le temps, sinon, on me donne plus de temps."
e. "C'est long pour moi écrire à l'ordinateur durant le cours. J'écris avec un doigt. En français et en anglais, mes examens (sont faits) sur l'ordinateur. Mon accompagnatrice écrit pour moi sur l'ordinateur."
f. "Je ne l'utilise pas à l'école, je suis plus tranquille à la maison."
g. "Je retranscris mes notes, j'ai aussi des preneur(euse)s de notes."

Student Article 4.4.2 **Potential appeal of computers**
a. Paraphrase: A few students wonder if computers might help with some tasks.
b. "Le(la) preneur(euse) de notes ne prend pas tout, je ne sais pas si mieux avec ordinateur."
c. Paraphrase: Il(elle) n'a pas essayé ou parlé de ça, (il(elle)) ne sait pas si ça vaut la peine.

Student Question (5)

Qu'est-ce qui fonctionne bien pour vous et quels problèmes avez-vous rencontrés au sujet des technologies informatiques? Quelles solutions envisagez-vous face aux problèmes mentionnés?

What works really well for you and what kinds of problems have you had with computer technologies? What are some possible solutions to the problems that you mentioned?

5.1 Student (Article 5.1) Qu'est-ce qui fonctionne bien pour vous? / *What works really well for you?*

Comments: Most students that responded to this part of the question indicated very concretely what worked well.

Student Article 5.1.1 **In the computer area**

a. "Le fait que j'ai un moniteur agrandi c'est merveilleux. C'est bien qu'on m'ait fourni des programmes, cela m'a donné de l'expérience. C'est génial, on m'a permis de voir bien."
b. "J'aime beaucoup mon clavier adapté, mais c'est long écrire, parce que j'écris avec un doigt."
c. "Sinon, je suis content de mon ordinateur."
d. "C'est bien d'avoir un ordinateur à jour."
e. "The cegep where I am is getting large print installed. No problems."
f. "When my system works, it works well but..."
g. "In Windows Explorer, you can turn off graphics. This makes it easier to read the screen and download faster."
h. "I have no problem with my laptop, it feels better."
i. "I like spell checkers because the grammar check is built in."
j. Paraphrase: One student informed us of "Le Visuel Antidote" for writing in French that s/he used on her laptop: "You can write your whole thing in French. It's like French words integrated with an English word. Because you can't have an English word and a French word together. So this one is in words and it will correct, you know, it will leave the red lines under it because it's a French word. In the French manner of speaking most of the words to get corrected. It's like another screen that pops up on side saying well this word should be spelled this way and they give you a choice."
k. Paraphrase: Another student told us that s/he has "access to the internet using a text-based program called Lynx. So, basically I'm able to do internet using that kind of system."
l. Paraphrase: A student shared that s/he was glad to have heard about the palm tops and how that can be integrated into a computer system. "If I could bring a palm top to take notes to a class instead of bringing my entire computer, my back will be a lot happier."

Student Article 5.1.2 **What works well with the system**

a. "Oui, parce que (le(la) répondant(e) local(e) à mon cégep) est bien informé(e), comme, ce que je pense c'est qu'il(elle) s'est informé(e), parce que moi au début, je lui ai demandé des informations, puis il(elle) n'était pas au courant, fait qu'il(elle) s'est renseigné(e): 'Attends on l'a ici.' Je m'étais informé(e). Je ne savais pas que ça existait, attends un peu je vais m'informer au Cégep du Vieux Montréal selon, alors il(elle) s'est informé(e). 'Bon ben, le Cégep du Vieux Montréal vont te le payer'." (refers to a stethoscope)
b. "Mais je suis content du(de la) (répondant(e) local(e)), au moins quand on demande quelque chose, il(elle) prend la peine, il(elle) analyse ça bien comme il faut avec les besoins."
c. "Moi je le(la) trouve très attentif(ve)..."
d. "Il(elle) dépanne au point de vue matériel comme les prêts et bourses."
e. "Pour moi le problème, c'est plus le problème primordial, c'est: si j'ai un problème avec l'ordinateur comment je contacte le(la) technicien(ienne)."

5.2 Student (Article 5.2) Quels problèmes avez-vous rencontrés au sujet des technologies informatiques? / *What kinds of problems have you had with computer technologies?*

Comments: Students were equally vocal with regard to what does not work.

Student Article 5.2.1 **Technical problems with hardware and software**

a. Paraphrase: L'ordinateur plante, bogue, les réparations prennent du temps, le réseau est lent, l'écran est mal placé.
b. "The biggest problem is that my system is not reliable. The problem is getting it to work reliably."
c. "I don't like carrying my laptop everywhere I go around the cegep."
d. "The problem with JAWS on Windows is that Windows is so graphic, you forget where you are."
e. "With JAWS, the response is slow (e.g., it's slow browsing the net). It's slow when you're going line-by-line down the text."
f. "Current monitor technology is hard to deal with, it hurts the eyes."
g. "Bon, à cette heure, les gros caractères, ils fonctionnent avec Windows, avant j'étais tout le temps en arrière des autres, puis ça marchait, ça marchait pas. C'était des problèmes de compatibilité, problèmes avec les autres."
h. "Sometimes the programs need to be upgraded. Like, sometimes there's a glitch in the program."
i. "J'avais besoin d'un (lecteur de) cédérom pour installer les programmes. Parce que je n'avais pas Office '97, il fallait tout le temps que je reste à l'école pour faire mes devoirs. Alors je perdais du temps."
j. "Que l'ordinateur fonctionne quand download."

Student Article 5.2.2 **Issues related to learning**

a. "Il faut apprendre vite, s'adapter à l'environnement."
b. "Je parle de nouveaux programmes, de nouveaux appareils… comme le logiciel de gros caractères que je parlais, ben dans (voilà) pas longtemps, ça n'existait pas. Je me débrouillais autrement."
c. "T'essaies, comment je pourrais t'expliquer ça, cliquer, puis ça ne fonctionne pas."
d. Paraphrase: 4 students also mentioned the fact that new programs come up and it's difficult to keep up.

Student Article 5.2.3 **Lack of resources to guide to what exists**

a. "Oui. C'est des fois ce n'est pas juste le problème que ça l'existe, ça l'existe pas, mais… Juste le problème qu'on ne sait pas que ça l'existe. Donc à cause (…) ce n'est pas, on a beau essayer de le demander, mais s'il y a personne (…) pour nous le dire que ça l'existe."

Student Article 5.2.4 **Financial**

a. "On parle (du programme gouvernemental), il y a des fois que, moi ça m'est arrivé de faire des demandes, puis on me dit, 'Ben on s'excuse, mais avec ce qu'on a donné, on ne peut pas, on ne peut pas donner plus' fait que le plus, ça nous aiderait autant que qu'est-ce qu'on a."
b. Paraphrase: "Parmi ceux (programmes) qui marchent moins bien," un(e) étudiant(e) a éprouvé de la difficulté à obtenir des logiciels "de gros caractères que j'utilise." Il(elle) explique: "Il a fallu que je passe par des moyens détournés parce que (le programme gouvernemental) ils ont dit non." Les représentants du programme lui ont dit qu'ils lui avait donné des appareils en Braille. Enfin, pour l'obtenir il a fallu que l'étudiant(e) prenne des moyens détournés "Ça fait que j'ai réussi, puis si je n'avais pas réussi de même, ben, au pire, au pire il aurait fallu que je le paye." Au sujet du Braille, l'étudiant(e) nous informe que, "En plus, ça m'aide autant, ça m'aide autant que qu'est-ce que les appareils en Braille."

Comments: In reference to software that students could use but which subsidy programs do not cover, there was a recurring sentiment:

c. "Puis (…) ce n'est pas donné ces programmes-là. Ça part à $600 en montant là."

d. "Whatever software or hardware enables me to get my work done (e.g., flat panel displays), but they're too expensive."

5.3 Student (Article 5.3) Quelles solutions envisagez-vous face aux problèmes mentionnés? / *What are some possible solutions to the problems that you mentioned?*

Student Article 5.3.1 **Suggestions**

Student Article 5.3.1.1 **Période d'essais**

Summary: Certain(e)s étudiant(e)s suggèrent les solutions suivantes : une période d'essais de l'équipement, avoir un logiciel de dictée, obtenir les livres à prix modiques, avoir un interprète sur l'écran.

a. "Mais ça serait quelque chose que (...) ça m'intéresserait d'essayer. Pas nécessairement mettre de l'argent là-dedans, pour essayer, puis me rendre compte que non après. Mais il y a sûrement moyen, peut-être un portatif pour que t'essayes une fois pour voir si ça vaudrait la peine ou non, mais ça serait quelque chose qui m'intéresserait."

Student Article 5.3.1.2 **Programmes - Hardware & Software**

a. Paraphrase: Prêter des portables, acheter de meilleure qualité, souris ergonomique.

b. "J'aimerais ça avoir un programme de dictée qui soit capable, par exemple, de saisir la voix et de faire une écriture automatique, parce que moi je n'entends pas, mais ça me prend un interprète, alors j'ai un interprète."

c. "Peut-être qu'il pourrait y avoir, je ne sais pas, dans le coin un petit médaillon avec un interprète, ça serait une idée. Je sais qu'aux États-Unis par exemple, ça existe un logiciel où il y a un petit interprète dans le coin là. Mais la technologie n'est pas très bonne ou avancée."

d. "Mais peut-être que les livres spéciaux d'informatique, mais en tout cas, je rentre peut-être dans une zone (...) mais peut-être que si nous autres on l'avait à prix mois élevé parce qu'on n'a pas vraiment le choix de se servir d'un ordinateur. Ce serait peut-être une bonne affaire je pense. Je ne sais pas si ça rapport avec ça ici là."

e. "Maybe the printer could be like quieter, because it makes a lot of noise."

f. "Different cities should work together to improve the technology (the creators of JAWS can't keep up with Microsoft upgrades). With agencies, I think they should try and have meetings with people with disabilities so we can voice what really works for us. We should have a say and explain what we need. The (designated rehabilitation center) and the government program is limited in what equipment it can get for you."

g. Paraphrase: One student recommended that software companies "should really start considering that there are people with disabilities around the world, you know, which adds up to millions and millions of people. I think if Microsoft really, really wants more money, they should work with the companies that develop the adaptive technologies and try and figure out the problems (...) Especially with the screen reading software."

h. "I think the different companies should try partnership and work together to try and improve the faults of the technology out there you know? Like for example, like ah the creator of JAWS cannot just keep up with the upgrade that Microsoft is doing every time. Especially also with IBM - with the new computers and the new hardware that they're coming out. Basically, every time the adapted technology keeps failing because they keep coming out with new stuff and people tend to want to upgrade to the new things out there. That's pretty much it."

i. "Flat panels don't give off radiation, so then what are the long-term effects of exposure to regular screens. The computer industry should slow down, make it work before upgrading. They talk about adding computers to cars (what if a car has an error when stopping at a red light, what do you do?). I would rather have a Mac."

Student Article 5.3.1.3 **General**

a. "Il y a place à l'amélioration."

b. "Cours ou un programme spécialisé qui serait offert pour les personnes ayant des incapacités."
c. Paraphrase: Il(elle) souhaite avoir un ordinateur.

Student Article 5.3.2 **Information sharing**
a. "I haven't heard of JAWS and scanning books, this is new to me. Even ordinary people would like some of this equipment. If I could bring a palm-sized computer instead of a laptop, my back would be happier."

Student Question (6)

Quels autres sujets vous concernent dans ce domaine?

What other issues concern you in this area?

6.1 Student (Article 6.1) Quels autres sujets vous concernent dans ce domaine? / *What other issues concern you in this area?*

Student Article 6.1.1 **Achat des technologies**
Summary: Les technologies informatiques des étudiant(e)s ont été achetées par la commission scolaire ou par les parents afin de répondre aux besoins de l'étudiant(e)-même ou à celui d'un autre membre de la famille.
a. "C'est le prof qui a fait des démarches pour que j'aie mon premier ordi fourni par la commission scolaire au secondaire, que j'ai eu finalement en secondaire IV. Il a duré deux ans, puis il marche."
b. "J'ai commencé à avoir un ordinateur au secondaire IV, parce que mon prof de français me donnait des dictées et j'arrivais à la fin de la dictée, je suis un gars qui a une bonne mémoire, je suis en théâtre, donc, il me manque telle phrase : 'Peux-tu me le dire,' donc je l'écrivais. Le monde avait fini de corriger, moi j'avais à peine fini d'écrire."

6.2 General commentary of participants

Comments: Students shared information with us that was relevant to the issue at hand, but which did not necessarily address any of the questions, or exceeded the boundaries of the question. We formulated this information in the same way as the direct answers. This section has been subdivided as follows:

Student Article 6.2.1 **Importance des technologies informatiques**
Summary: Quelques étudiant(e)s accordent une certaine importance aux technologies informatiques. Plus spécifiquement, un(e) étudiant(e) explique qu'il est important d'avoir un ordinateur à la maison quand les laboratoires de son établissement d'enseignement sont occupés, toutefois, il(elle) peut se débrouiller sans ordinateur; un(e) autre trouve qu'utiliser un ordinateur facilite les choses et le(la) dernier(e) travaille toujours avec un ordinateur.
a. "Quand même je trouve ça important d'avoir un ordinateur à la maison quand il y a plein de monde."
b. "Je me débrouille encore (sans ordinateur), mais il va y avoir un temps que peut-être je ne pourrai plus. C'est plus dans l'éventualité que (...)"
c. "Moi j'aime ça, c'est plus facile (avec un ordinateur)."
d. "Oui, j'ai un ordinateur. Je travaille tout le temps là-dessus."

Student Article 6.2.2 **Avantages qu'offrent les technologies informatiques**

Summary: Parmi les avantages mentionnés par les étudiant(e)s, certain(e)s précisent que les technologies informatiques permettent de faire un travail de meilleure qualité et plus rapidement que manuellement.

a. "En tout cas, pour moi c'est plus long, puis c'est moins propre, puis peut-être que je ne suis pas capable ... je suis capable de me relire là, mais pas tout le temps là, donc des fois, les dictées en bureautique, c'est vite, vite, vite. Si j'avais peut-être un ordinateur ou les outils peut-être pour accélérer, j'aurais peut-être moins de difficulté."

b. "Ça a un lien direct avec mon handicap, regardez ma signature, vous allez comprendre tout de suite. C'est très long à écrire de un, et pour les profs, un quatre pages, je ne serais pas lisible. Puis de deux, pour moi, ça me prendrait trois heures, sur une production de quatre heures, ça me prendrait trois heures de plus et je n'aurais pas un propre, je n'aurais qu'un brouillon, (alors) que là, avec le portable, même si je n'ai pas énormément de temps, je ne suis pas obligé de faire un propre après parce que c'est déjà propre, je ne peux pas l'améliorer en propreté, j'ai juste à dire : 'OK! Ça prend ça, et ça là,' parce que je connais les fichiers de traitement de texte, et je prends toutes mes notes, dans mes cours, quand je prends des notes, même le monde qui fait des gribouillis sur leur feuille pendant les cours, moi je le fais à l'écran. Donc je m'en sers à tous les jours parce que j'ai besoin d'une production écrite à main."

Student Article 6.2.3 **Problèmes et désavantages présentés par les technologies**

Summary: Les étudiant(e)s ont mentionné(e)s certains problèmes relatifs aux technologies informatiques comme le besoin de mettre les ordinateurs à niveau (upgrade) ou que les directives sonores ne sont pas adéquates pour un(e) étudiant(e) ayant une déficience auditive.

a. "Il y a aussi, par exemple, pour des activités, je ne sais pas quoi, n'importe quel genre d'activité; lorsqu'il y a des activités qui sont faites à l'ordinateur et qu'il y a une espèce de voix qui dit 'Bravo' ou 'Félicitations' qui se (fait) entendre, moi je ne (l')entends pas, donc je n'ai pas accès à ces aspects auditifs des logiciels."

b. "Non, c'est beau, mais, moi, j'amenais le point comme il(elle) disait (sur les) adaptations, les grossisseurs d'écran, là; moi je sais quand j'ai eu ce problème-là, avant de porter mes lunettes, parce que je ne voyais pas tout le temps l'écran, il y a quelque chose dans Windows '95 qui fait que déjà les écritures grossissent, puis en tout cas, en attendant, j'avais, moi, trouvé ce moyen-là. C'est ça, donc, je trouvais ça bien, mais quand même il y avait des moyens peut-être de changer, je ne sais pas, la nature du handicap, je ne sais pas, la nature de la déficience (...) Moi, tant que j'ai rencontré ce problème-là, j'ai fait (...) j'y ai été à tâtons, comme on dit encore, j'y ai été jusqu'à temps je le vois comme il faut."

c. "Win 95 and 98 are so unstable. Macs are the best, they are very reliable and don't crash."

d. "Computer technology isn't stable (Win 95/98). Scanning text when they're already written in word processors and I would like to get at that. The time it takes to scan books (wasting my time)."

Summary: Devant les difficultés rencontrées, un(e) étudiant(e) mentionne qu'il(elle) a trouvé(e) des moyens alternatifs. En effet, ayant une déficience visuelle, cet(te) étudiant(e) a trouvé(e) l'option d'agrandissement de caractères dans Windows pour répondre à ses besoins.

Student Article 6.2.4 **Non-utilisation des technologies**

Summary: Parmi les raisons exprimées qui expliquent l'absence d'utilisation des technologies, un(e) étudiant(e) cite son habileté à écrire en abréviation et ceci lui permet de fonctionner dans le groupe.

a. "Ben, ça dépend, écrire des notes, oui, en tout cas, ça a l'air que j'ai plus de difficulté. J'ai appris à (...) tu sais (à) écrire en abréviation (à la main), mais juste que c'est plus long. C'est ça un petit peu, mais je suis capable de fonctionner dans le groupe. Ben, c'est ça, j'ai appris, dans le fond, à me débrouiller avec ce que j'ai."

Student Article 6.2.5 **Usage de l'internet**

a. Paraphrase: Parmi les utilisateurs(trices) de l'internet, un(e) étudiant(e) mentionne ne pas avoir d'adresse mais explique que "Je suis branché. Je connais l'info." et qu'à son établissement d'enseignement, il y a "60 postes sur internet, il y en a énormément" sur "peut-être 250 postes."

b. Paraphrase: Un(e) étudiant(e) mentionne avoir la possibilité d'une adresse à l'école qui est partagée avec les autres étudiant(e)s qui utilisent le poste de travail : "Mais nous c'est une adresse par poste (de travail). Admettons qu'on est dans tel local, puis c'est un numéro de poste (de travail), bon ben, cet ordinateur a une adresse. Sauf que c'est ouvert à tout le monde."

c. Paraphrase: Certain(e)s ont également accès à une adresse électronique à la maison, comme Hotmail qui est aussi accessible ailleurs: "Moi, j'ai l'internet. J'ai un Hotmail, mais chez moi aussi, mes parents ont une adresse électronique, mais c'est que, moi, pour avoir plus d'intimité, j'ai décidé de faire ça : tu vas sur le site de Hotmail.com, puis là tu t'inscris, fait que là tu as ton adresse, mais j'ai accès à mon Hotmail, au cégep là, j'ai accès n'importe où à mon e-mail."

d. Paraphrase: Enfin, un(e) mentionne ne pas avoir de courriel : "Je n'ai pas de e-mail, j'en n'ai pas pris."

Student Article 6.2.6 **Adaptation des cours**

Summary: Certain(e)s étudiant(e)s se sentent en retard par rapport aux autres étudiant(e)s puisque leur cours n'est pas adapté à eux :

a. "C'est mal structuré à ce niveau-là, parce que les autres sont toujours en avance parce qu'ils entendent et en même temps ils peuvent taper, alors que nous, on est toujours en train de se demander ce qui se passe, on est toujours en retard. Mais dans la plupart des cas, je ne dis pas toujours, mais dans la plupart des cas, ça arrive."

b. "Les personnes ayant des incapacités demandent plus d'aide je pense, ça prend plus de temps au niveau de l'apprentissage, donc les étudiant(e)s sans incapacités sont toujours un peu plus en avance que les personnes ayant des incapacités, on est toujours un peu en retard."

c. Paraphrase: Au niveau des cours de langue, une difficulté linguistique pour l'étudiant(e) ayant une déficience auditive lors de l'interprétation peut causer un problème: "Oui, c'est via un interprète. Le problème pour moi, mais ce n'est pas un problème parce que j'arrive très bien à lire, j'ai une bonne maîtrise du français mais (pour) d'autres élèves (...) s'il y a des phrases écrites en français qui sont très convulguées, ils(elles) ont des difficultés. Il faut que l'interprète les traduise qu'ils(elles) puissent comprendre alors c'est plus à ce niveau-là. Au niveau anglophone, c'est différent là, c'est une autre affaire, mais au niveau francophone, je sais que c'est la problématique qui existe pour certaines personnes qui ont de la difficulté avec le français écrit, ça prend vraiment un interprète pour le changer."

d. Comment: Les mêmes problèmes qui existent pour la langue anglaise (LSQ) existent pour l'ASL pour les étudiant(e)s francophones qui sont sourd(e)s: "Pour les sourd(e)s, apprendre l'ASL ce n'est pas tellement la chose qui est compliquée, ce qui est compliqué c'est d'apprendre la langue écrite et lue en anglais."

Student Article 6.2.7 **Attitudes des professionnel(elle)s**

a. Paraphrase: Un(e) étudiant(e) a mentionné(e) que le professeur ne semble pas savoir quoi faire avec un(e) étudiant(e) en chaise roulante et un(e) autre explique que le(la) professionnel(elle) ne reconnaissait pas légalement sa déficience : "Là, je me rappelle les premiers temps, j'arrivais en chaise roulante le professeur me regardait et faisait (bouche grande ouverte): 'Qu'est-ce que je fais?' 'Ben trouve moi une table tu sais, je ne peux pas, je ne peux pas suivre le cours avec toi là.' Puis: 'Ah, OK, c'est beau!' C'est comme, le professeur, peut-être, relate de ça, ils ne s'en rendent pas trop compte, le cégep ne s'en rend pas trop compte. Là, ça commence parce qu'on est rendu plusieurs là, mais je sais que la première année on était pas, on était moi, puis une autre personne. Là on est rendu 5 ou 6."

b. "I was diagnosed as dyslexic but a school psychologist didn't believe me ... I didn't get a desktop through government programs because so many doors were slammed in my face. We didn't look into government programs because of the psychologist's evaluation."

Student Article 6.2.8 **Problèmes - centres de réadaptation et instituts**

Summary: Le manque de conscientisation au sujet de la désuétude des ordinateurs offerts et la liste d'attente ont été mentionnés comme problèmes liés aux programmes de subvention.

a. "They have to realize that computers are being constantly upgraded."
b. "I applied at the (designated institute) for a laptop and it took a year. I hate the waiting lists."
c. "The (designated rehabilitation center) is always a hassle."
d. "The (designated rehabilitation center) should clean up their act, they're lousy, too much paperwork, they don't want to get bored maybe? The French organization equivalent of the designated rehabilitation center (is) much faster in providing equipment."

Comment : Some students also mentioned the following problems in regards to the designated institute.

e. "The (designated institute) wanted (me) to switch to DOS in the middle of the school year."
f. "The (designated institute) gave me a computer but they give you what they think you need, not what you need."
g. "The (designated institute) only works from 8 to 3pm (inconvenient). It would help if they offered something in the evening or during summer."
h. Paraphrase: Concerning equipment obtained from designated rehabilitation centers, one student commented that: "They should offer choice within certain boundaries."
i. Paraphrase: One student said "The agencies should try to have meetings with the individuals with disabilities to find out from them what really works. We should be the one (to) tell them exactly what we need." Students added that budgetary constraints and lack of manpower should not be the determining factors for the equipment students receive. The students also elaborated that "the waiting lists are so long," and this makes it "very frustrating to get new equipment."

Student Article 6.2.9 **Environnement physique: problèmes**

Summary: Les difficultés rencontrées touchent les bureaux avec chaises attachées, l'espace dans les toilettes, les poignées de portes difficiles à ouvrir ou l'environnement en général.

a. "Bon tu sais, quand tu as un local avec une chaise accrochée là, bon ben comme nous, à mon établissement d'enseignement là, c'est toutes des chaises comme ça. Mais, il y a pas dans tous les gros cours, comme nous autres, comme moi, je suis dans un fauteuil (roulant) de temps en temps, mais quand j'en ai besoin, j'aime ça avoir, tu sais, la table pas de chaise attachée. Mais, c'est dur à trouver parce qu'il n'y en a pas tout le temps."
b. "Les toilettes. Ça dépend, peut-être ici elles ne sont pas, c'est peut-être pas pareil, mais nous, c'est vraiment pas adapté là. Il y a une toilette puis, qui est adaptée, ou deux, puis elle est style au deuxième étage, mais nos cours sont au troisième, ou c'est le contraire. En tout cas, quand t'as un cours à un étage, puis il n'y a pas de toilette adaptée, quand tu as ton fauteuil (roulant), tu rentres dans la salle de bain, t'ouvres la porte, t'as un mur devant toi. Mais (...) Il faut que tu te tasses, puis tu sais (...) puis après la ré-ouvrir, c'est, c'est une autre affaire tu sais, c'est quelque chose, ça paraît niaiseux là, mais c'est quelque chose qui serait peut-être à améliorer. C'est pas que j'ai super gros de difficulté à le faire quand je suis dans un fauteuil (roulant), mais c'est quand même quelque chose qui me rendrait peut-être la vie plus facile."
c. "Oui, à (mon établissement d'enseignement), c'est beaucoup l'environnement. Ben les portes, tu sais comme pour moi, c'est difficile d'ouvrir une porte puis de la tirer, bon ben là, ce serait à voir à juste mettre une poignée qui baisse, ben tu sais, à mettre une poignée que je puisse la saisir sans la tourner. Pour moi, c'est plus le côté environnement que ça me cause problème, là."
d. Paraphrase: Un(e) étudiant(e) mentionne que le transport vers son établissement d'enseignement est une de ses préoccupations: "Moi, moi j'ai une auto, moi je suis capable de conduire, fait que je n'ai pas de problème avec ça, mais je m'étais informé(e), puis vu que je ne restais pas, vu que j'avais le fauteuil (roulant) quand même, il fallait que je prévoie si je pouvais me rendre au cégep en fauteuil (roulant), tu sais. Si (j'avais) pas pu me rendre là, moi, j'étais dans de beaux draps, pour ne pas dire, pour pas dire le mot qui commence par 'm'. Moi, non, il n'y avait, j'aurais pas eu de transport, si jamais pas eu droit à mon permis de conduire."

e. Paraphrase: Cependant, un(e) étudiant(e) n'a pas rencontré(e) de problèmes liés à l'accessibilité de l'environnement : "Au cégep, à (mon établissement d'enseignement), on a moins de problèmes d'adaptation. Parce que d'après moi, ça fait plus longtemps qu'ils sont équipés pour les fauteuils roulants. Comme il y a trois étages où il y a un ascenseur, mais beaucoup de sous pallier, tu montes trois marches puis à côté, il y a une rampe. Je ne suis pas en fauteuil roulant, j'en connais un, mais je ne le(la) connais pas, puis ce n'est pas de gros problèmes là, l'adaptation est quand même assez faite. Quand vous disiez, l'affaire des bureaux, à peu près dans chaque local, il y a un bureau (sans) chaise. Il y en a une couple. Tu demandes pourquoi ils sont là."

Student Article 6.2.10 **Wish list**

Summary: Certain(e)s étudiant(e)s aimeraient voir des adaptations faites aux bureaux et à l'écran de l'ordinateur.

a. "(Ce qui serait mieux), mais peut-être (arranger) la hauteur du clavier, peut-être un peu."
b. "Oui, que l'écran soit au bon endroit."
c. "Parce que ça, ce n'est pas pareil. Un fauteuil électrique, il faut dire que les adaptions aux autres, veux, veux pas, il faut que ça soit plus bas tu sais comme, il faudrait qu'il y ait comme un juste milieu. C'est comme dans le fond (...) Tu sais comme ça, en parlant des bureaux, oublie pas, tu sais comme, moi avant que j'arrive (...) des personnes handicapées qui étaient là, c'était des personnes en fauteuil électrique, fait que veux veux pas, les bureaux (...) fait qu'il y a eu une certaine adaptation, mais pas, pas pour nous autres."
d. "Peut-être qu'il pourrait y avoir, je ne sais pas, dans le coin, un petit médaillon avec un interprète, ça serait une idée. Je sais qu'aux États-Unis par exemple, ça existe un logiciel où il y a un petit interprète dans le coin là. Mais la technologie n'est pas très bonne ou avancée."

Service Provider Focus Group Data Summary

A total of twenty-five service providers participated in the ITAC focus groups. The only English focus group, which was held in Montréal, had five service providers. The Montréal French focus group included six service providers. Two individual interviews were held later on. In Québec City, the focus group was divided into two groups, one with six and the second with eight service providers. These included service providers assisted by the eastern region representative. In these focus groups, the same questions were asked and most of these questions were themselves subdivided into several parts. The uneven number of responses is due to the fact that not all service providers responded to all parts of every question, either because that part of the question was irrelevant, or because the participants chose not to respond.

Service Provider Question (1)

Dans votre cégep, comment les technologies informatiques pour les étudiants ayant des limitations fonctionnelles sont-elles organisées? (Par exemple, quel genre d'équipement avez-vous, où est-il situé, qui en prend soin, qui montre aux étudiants comment l'utiliser, qui le répare, y a-t-il un programme de prêts, quel rôle les autres services tels le service audiovisuel, de la bibliothèque et le service informatique jouent dans l'offre de services informatiques aux étudiants ayant des limitations fonctionnelles?)

At your cegep, how are computer technologies for students with disabilities organized (e.g., what kinds of equipment do you have, where is it located, who looks after it, who shows students how to use it, who repairs it when broken, is there a loan program, what is the role of other departments such as the library audio-visual and computer services in providing computer services to students with disabilities)?

1.1 Service Provider (Article 1.1) Dans votre cégep, comment les technologies informatiques pour les étudiants ayant des limitations fonctionnelles sont-elles organisées? / *At your cegep, how are computer technologies for students with disabilities organized?*

Comments: There appeared to be two types of responses from service providers.

Service Provider Article 1.1.1 **Lack of equipment**

a. "À ma connaissance, on n'a pas de technologies adaptées à cette clientèle-là, au niveau de l'informatique."

b. "Oui. Alors chez-nous, actuellement, il y en a pas là. L'an prochain, on aura un logiciel d'agrandissement (...) (Les étudiant(e)s n'ont) pas besoin d'informatique."

c. "Mes étudiant(e)s handicapé(e)s arrivent avec leur ordinateur (...) donc ils(elles) arrivent jamais non équipé(e)s. Donc quand ils(elles) arrivent avec leur ordinateur, à ce moment-là, tu comprends, je n'ai comme pas d'adaptation vraiment à faire."

Service Provider Article 1.1.2 **Lack of organization**

a. "Comment c'est organisé? Ça ne l'est pas vraiment. C'est de la débrouillardise, il n'y a pas de programme."

b. "Oui, oui. Ce qu'on a pu faire aussi dans le passé, c'est dans un laboratoire de langues où on avait des étudiant(e)s avec des problèmes auditifs. Avec le(la) technicien(ienne) on a été capable (...) le(la) technicien(ienne) a pu changer les fréquences, ce qui a permis à un(e) étudiant(e) entre autres de pouvoir entendre, et qu'est-ce qui se disait sur la cassette. Pour d'autres, ça n'a pas fonctionné, on a dû faire d'autres adaptations, mais on avait déjà essayé d'adapter un petit poste comme ça, en disant: 'OK, on va pouvoir sur demande modifier les fréquences'. Alors le(la) technicien(ienne), ce qu'il avait fait, finalement, c'est qu'il a repris l'audiogramme de l'étudiant(e), puis avec son audiogramme, il avait été capable de manipuler en tout cas les fréquences. Donc, je ne peux pas te dire si le poste est trop haut, est trop bas, la table, tu sais des positions ergonomiques, ça je t'avoue que j'en étais pas conscient(e) jusqu'à tant que je me rende à la dernière rencontre là parce que mes étudiant(e)s ne m'en ont pas parlé , puis que moi je n'ai pas allumé là-dessus."

Comments: In fact, there seems to be a strong tendency among service providers (especially in the francophone sector) to characterize the level of organization of the equipment as unsystematic.

1.2 Service Provider (Article 1.2) Par exemple, quel genre d'équipement avez-vous? / *For example, what kinds of equipment do you have?*

Summary: Service providers told us about the type of equipment that they have. The type of equipment mentioned ranged from old technology to more sophisticated hardware.

Service Provider Article 1.2.1 **Hardware**

a. Paraphrase: The range went from a "486 which has been bumped up so it's running Windows 95," to newer equipment such as a "Pentium 266" which is quite new, to "un PC portatif."

Service Provider Article 1.2.2 **Sophisticated hardware**

a. "Computers in the little lab are hooked up, they're hardwired to our network so they have internet access that's very speedy and very good."

b. "I purchased a year or so ago a nice Pentium 2 MMX technology which would allow (...). It was for students, to buy either Dragon Naturally Speaking or ViaVoice or some program to allow voice-text transcripts. We do have a Kurzweil reading machine. We've got a CCTV."

Service Provider Article 1.2.3 **Specialised and mainstream software**

a. "Large screen software such as ZoomText and MGA Quick Desk."
b. "On a déjà eu un, un ordinateur avec, ben une télévisionneuse là."
c. "Avec un logiciel de grossissement."
d. "CCTV in the library." and large screen."
e. "Windows NT, c'est du Windows de réseau."
f. "Il y a des appareils qui sont installés, tels télévisionneurs, donc qui permettent d'agrandir. Il y a aussi un moniteur grand écran, je ne me souviens plus combien de pouces là, mais un grand écran qui nous permet de plugguer un ordinateur et de voir les lettrages en plus grand pour les élèves qui ont un problème visuel."

Comments: These are a summary of products mentioned by service providers in both English and French cégeps.

Service Provider Article 1.2.4 **Comments on Service**

a. Paraphrase: One service provider told us about compatibility problems: "J'ai fait venir un logiciel, je crois que c'est d'ici également, pour le grossissement des caractères, mais ça ne fonctionne pas sur NT (...) Cette personne-là, on a dû la débrancher du réseau pour qu'il(elle) puisse fonctionner à l'extérieur du réseau; on peut dire avec son propre ordinateur et Windows 95."
b. Paraphrase: In reference to how and what technologies are used and the process of obtaining these from the central cegeps, one service provider echoed a view that was expressed by many. In this particular case, a student needed "C-Note who didn't have a laptop computer, and within a day they were sent here. The support's amazing there (re: the centralized computer equipment loan bank for the Western region)."
c. "Qu'est-ce qui est déjà arrivé avec un(e) autre étudiant(e), c'est que lui(elle), dans ses cours, il(elle) ne se sert pas d'un ordinateur. Il(elle) a des preneur(euse)s de notes. Sauf qu'il(elle) suit certains cours qui se passent à un poste informatique. Et à ce moment-là, on se rend compte à cause des limitations physiques de cet(cette) étudiant(e)-là, le poste de travail n'est pas compatible... Alors, on a été capable avec le (parc mobile d'appareils/d'équipements informatiques de notre région) qui nous fait des prêts de certains outillages, d'aller chercher un écran plus grand pour sa vision parce qu'il(elle) avait des problèmes de vision, il(elle) avait des problèmes aussi au niveau de la motricité, donc on a été capable de chercher une souris qu'ils appellent trackball, qui est différente et qui permet à l'étudiant(e) de ne pas cliquer en même temps qu'il(elle) fait un mouvement latéral. Ça lui permet juste de faire un seul mouvement avec sa souris. Bon, des choses comme ça, comme je te dis, moi j'ai été capable d'aller chercher l'équipement au (parc mobile d'appareils/d'équipements informatiques de notre région) (...) parce que chez-moi je ne l'avais pas, j'avais tout simplement les laboratoires ordinaires d'informatique."
d. "I just was using an evaluation copy of JAWS for Windows 3.2, which just came out."
e. "A lot of DOS-based technologies, you know like Artic technologies and Oscar (...) we have a Brailler that we use very little."

1.3 Service Provider (Article 1.3) Où est-il situé? / *Where is it located?*

Service Provider Article 1.3.1 **Centralized**

a. "We have a technical room which does belong to the department, so it's accessed by students with physical or learning disabilities."
b. "Ce qui a trait à l'utilisation de la nouvelle technologie, la technologie informatique, chez-nous on a un nouveau carrefour technologique qui date depuis deux ou trois ans minimum."
c. "Donc pour répondre grosso modo à la question, c'est vraiment du cas par cas. Il a fallu trouver une télévisionneuse, on trouve une télévisionneuse, mais une télévisionneuse c'est pesant, alors il a fallu trouver une clé pour l'ascenseur pour l'amener jusqu'en haut."
d. "Basically, the services for students who have disabilities at my institution are housed within the Learning Center, which helps students not only with physical disabilities but also with learning disabilities."

e. "The equipment that we have is packed within a separate room, kept segregated."
f. "Nous, on fournit souvent un local pour que l'étudiant(e) puisse, on va dire cubicule, parce que local c'est trop grand pour qu'il(elle) puisse entreposer ses choses. Pour lui faciliter de ne pas se promener toujours avec de l'équipement lourd, parce qu'il y en a qui ne veulent pas avoir ça sur un chariot à roulettes, ça les embête plus que d'autres choses."
g. "Concernant les malentendant(e)s, il y a aussi, aux services aux étudiants, un téléscripteur qui est disponible sur demande, donc il y a un local qui est aménagé à la fois pour les interprètes gestuels et tout élève qui a un handicap, donc un local qui est disponible pour ces élèves-là s'ils(elles) ont besoin d'une utilisation spécifique, voir le téléscripteur, soit passer un examen dans un local fermé, ou, par entente avec les professeurs. On peut utiliser ces locaux-là pour différents, différents besoins."
h. "All equipment, all computer technology in the college is of course available to our disabled students. I have a small computer lab, which is specifically for the use of students with disabilities."

Service Provider Article 1.3.2 **Decentralized in mainstream computer labs**
a. "There is no specific site for students with disabilities to use the computer equipment that we have. We basically integrated it into the labs that are there."
b. "On s'était entendu avec la bibliothèque pour que la, télévisionneuse soit placée à la bibliothèque pour assurer une sécurité."

Comments: In regard to where computers are kept, service providers who responded to the section stated that the technologies were located either in a centralized area or kept in areas with other computers

c. "Les scanners, cette année on avait un(e) étudiant(e) qui en avait de besoin, alors, c'est l'association générale des étudiants, que moi j'ai été rencontrer et je leur ai demandé s'il y avait moyen, comme, un, un genre de petit protocole d'entente, s'il y avait moyen que mon étudiant(e) puisse se présenter chez-eux, à l'association, puisse scanner les documents. Alors, à ce moment-là, il n'y avait aucun problème, et il(elle) a pu procéder de cette façon-là. Il y en existe ailleurs des scanners, mais je trouvais que la procédure était trop lourde. Mais il y avait une autre alternative qu'on pouvait aller, via le soutien plus technique, mais comme je te dis, c'était plus compliqué pour l'étudiant(e). Tandis que là, c'est au rez-de-chaussée, il y a l'entente, puis c'est plus facile pour lui(elle), que de venir me demander la permission d'aller à telle place."

1.4 Service Provider (Article 1.4) Qui en prend soin? Qui le répare? / *Who looks after it? Who repairs it when it's broken?*

Summary: It appears that technicians are either affiliated to the office for students with disabilities, or general computer technicians do the repairs.

a. "We are fortunate enough to have a technician who's sort of self-taught. This person can do a lot of the short-term troubleshooting. Otherwise, we have to depend on people from our computer services to come down and to do the bigger repairs, or to call out to the manufacturer."
b. "Troubleshooting for any of this equipment is done by our library and information technology center, they have a technical staff who are on call. They may not be able to respond within an hour, but certainly they always respond within a day or two to any kind of specific problem that we may have and usually these things come up once in a while."
c. "Pour les réparations, l'audiovisuel peut en faire, mais s'il faut, on envoie l'appareil à l'extérieur."
d. Paraphrase: To summarize the various responses, some participants answered that the equipment was looked after and/or repaired by the following: AV, service from the library, some send it back to the centralized computer equipment loan bank for their region, and if broken, send it to an outside group.

e. Paraphrase: Equipment seemed to be repaired by the group that hosts it: "Oui, c'est mon service (qui prend soin de portables et de télévisionneuses. À moins que j'aie une preuve que l'étudiant(e) a vraiment massacré volontairement, mais en ce moment, c'est moi qui assume tout ça. C'est déjà arrivé, qu'il y a eu, j'sais pas quoi, que les programmes ont sauté, on les a fait réparer par notre système informatique, d'ici."

1.5 Service provider (Article 1.5) Qui montre aux étudiants comment l'utiliser? / *Who shows students how to use it?*

Service Provider Article 1.5.1 **Some service providers train students**

a. "I'm not suggesting lot of things to students. I ask them what their needs are, and we've been able to adapt, but it's been really difficult."
b. "Habituellement, c'est moi."
c. "Les autres appareils qui sont à la bibliothèque, c'est habituellement, la première fois que je rencontre l'élève, c'est moi le(la) répondant(e) local(e), coudonc qui va aller lui montrer les appareils."

Service Provider Article 1.5.2 **Some external agencies train students**

a. "Et, ils(elles) (les étudiant(e)(s)) ont été formé(e)s par le centre (de réadaptation) je n'ai pas eu à m'occuper de ça."
b. The students "take courses outside of (the office for students with disabilities) or are self-taught."

Service Provider Article 1.5.3 **Sometimes someone else in the cegep trains students**

a. "Je sais qu'autrefois on avait un technicien(ienne) qui montrait aux étudiant(e)s comment l'utiliser, le poste a été coupé, alors là on a un technicien(ienne) qui vient à temps partiel. Alors, il est à temps partiel, alors on donne aux étudiant(e)s l'horaire de la technicien(ienne)."
b. "We do provide one-on-one tutoring for computer use. Either we will do it, or we'll hire a student. Our rationale for doing it - because clearly our mandate is not tutoring, but that doesn't matter - our feeling is that if we're going to be providing equipment, and there's no tutoring for that equipment, then we're not really providing the service, so we will teach students how to use the equipment."

Service Provider Article 1.5.4 **Some students already have computer knowledge**

a. "A lot of the students come in with strong knowledge of the equipment used, if these are students again who are visually impaired, blind, or supported by the designated rehabilitation centers."
b. "The students take computer courses, most of them arrive already with a basic working knowledge of WordPerfect or anything and we've seen that a few of them have moved into internet usage but from what I can gather they make very little use of the internet services at the College."

Comments: Showing students how to use the computers does not seem to be a systematic service offered by the DSS, although in smaller colleges service providers do.

1.6 Service Provider (Article 1.6) Y a-t-il un programme de prêts? / *Is there a loan program?*

Comments: This question was answered in two ways. Some participants responded in regard to loans granted by the two centralized computer equipment loan banks (eastern and western regions). Others responded about whether or not the cegeps made loans to students: One service provider expressed that: "In terms of loan, I wasn't sure whether you were asking about whether we loan out equipment or whether we are able to borrow equipment."

Service Provider Article 1.6.1 **Centralized equipment loan banks**

a. "I found that the (centralized equipment loan bank for my region) has been very helpful for lending supplies. We don't have a real need for spending three or four thousand dollars that may be a one-shot deal, and the student is here temporarily so we borrow."

b. "Oui, on a la banque provinciale, oui, c'est ça, si on a un appareil, on a besoin d'un appareil qu'on ne possède pas localement, on demande (au parc mobile des appareils de notre région) ou (de l'autre région s'il y a lieu), l'appareil peut circuler dans le réseau."

Service Provider Article 1.6.2 **Other sources (own or regional)**

a. " If there's something that we're missing, theoretically we could call (the centralized equipment loan bank for our region), and if they have the equipment in storage they will loan it to us. We tend not to use their equipment because we have a fair amount of our own and we figure there's other institutions with greater needs."

b. "On aurait pu utiliser le service de prêt du (parc mobile des appareils de notre région) (...) Mais comme le centre de réadaptation nous fournissait tout ça, ben, on n'en a pas eu besoin mais ce n'est pas le collège qui l'a donné."

Service Provider Article 1.6.3 **Loaning to students**

a. "Oui, c'est relié à lui(elle), on le fait venir pour lui(elle), à ce moment-là, on lui prête un local ou il(elle) peut l'apporter chez lui(elle). Ça dépend des types d'appareils aussi."

b. "C'est ça. Des démarches, ici, Sainte-Foy, Vieux Montréal ou même chez-nous à la fondation du cégep, à l'occasion, ils donnent des bourses à certain(e)s étudiant(e)s qui en ont besoin."

c. "Loaning (our) equipment to students, we tend to be very reticent about doing it. We have lent out a few of our older laptops, but what we do is ask the students to bring us a proof that they have home insurance, because once the equipment is off our property and they got it at home and they get broken into."

d. "C'est déjà arrivé que nous, on a acheté un ordinateur portatif, pour dépanner des étudiant(e)s qui s'en servaient d'ordinateur portatif, puis pour une raison X, ça brisait dans un examen ou des choses comme ça, OK! Donc ça je le prête carrément."

Service Provider Article 1.6.4 **Not loaning to students**

a. "We don't lend out equipment, we don't have laptops or such things that we lend out to the students."

b. "Chez-nous aussi, on n'a pas de systèmes de prêt là."

Summary: Of these service providers who responded, only one said they loan, but with various restrictions. Most service providers did not respond to this question.

1.7 Service Provider (Article 1.7) Quel rôle les autres services tels le service audiovisuel de la bibliothèque et le service informatique jouent dans l'offre de services informatiques aux étudiants ayant des limitations fonctionnelles? / *What is the role of other departments such as the library audio-visual and computer services in providing computer services to students with disabilities?*

a. "There is support equipment that is available which is kept in Student Services, track balls, things like that. But the overall usage of computerization is very, very limited at the college."

b. "On avait un service d'agrandissement par l'imprimerie aussi et on a un(e) technicien(ienne) à l'audiovisuel qui peut donner support. Les gens de la bibliothèque connaissent l'opération de la télévisionneuse."

c. "The labs, of course students in Social Sciences who have to do RM and QM can go into the labs to work."

d. "CCTV is in the library."

e. "On a aussi une entente avec le service informatique au collège là, pour ceux(celles) qui ont, pour les étudiant(e)s qui ont des ordinateurs, qui ont besoin d'une installation de logiciels, de choses."

f. "On fonctionne (...) les fois où on a eu des besoins, on est allé avec l'audiovisuel, parce qu'eux, ils ont des technicien(ienne)s, fait qu'on va comme ça là, mais il n'y a pas d'entente officielle, c'est vraiment sur le bras."

Comments: Sometimes, other student services which are already in place can be used (i.e., library, audiovisual department), but generally this is not done in a methodical way.

Service Provider Question (2)

Si vous assistez les étudiants dans l'utilisation des technologies informatiques, comment avez-vous appris à les utiliser? Comment cela a-t-il fonctionné pour vous? Y aurait-il une autre façon d'apprendre qui vous aurait été utile? Si vous n'assistez pas les étudiants dans l'utilisation des technologies informatiques, qui le fait? Comment ont-ils appris à les utiliser? Comment cela a-t-il fonctionné pour eux? Y aurait-il une autre façon d'apprendre qui leur aurait été utile?

If it is you who assists students in using computer technologies, how did you learn to use the technologies? Did this work well for you? Is there some other way of learning that would have been helpful? If you don't assist students in using computer technologies, who does? How did they learn to use the technologies? Did this work well for them? Is there some other way of learning that would have been helpful?

2.1 Service Provider (Article 2.1) Si vous assistez les étudiants dans l'utilisation des technologies informatiques... / *If it is you who assists students in using computer technologies...*

Comments: Most service providers did not respond directly to this portion of the question.

Service Provider Article 2.1.1 **Cegeps in the eastern region**

Summary: Of the 14 service providers in this focus group, nine said that they "n'assistent pas les étudiant(e)s." "L'aide qu'ils offrent c'est de trouver quelqu'un de compétent pour assister." Two said "oui" and specified: "qu'il(elle) assiste les étudiant(e)s, il(elle) agit au meilleur de ses connaissances, dans la mesure du possible," and "qu'il(elle) assiste des fois les étudiant(e)s, mais ce n'est pas l'essentiel de sa tâche." One specified that, for the current year, s/he did not: "Ah ben moi, cette année, on n'a pas eu à donner de l'assistance en tant que tel."

Service Provider Article 2.1.2 **French cegeps in the western region**

Summary: 3 of the 5 service providers in this focus group responded "no" to this part of the question.

a. "Alors, ce n'est pas le(la) répondant(e) local(e)."
b. "Moi, je n'assiste pas les étudiant(e)s dans l'utilisation des technologies informatiques."
c. "Même chose pour moi, je m'occupe pas personnellement de, de l'utilisation (des) technologies informatiques (des) étudiant(e)s."

Summary: One said yes: "Qui assiste les étudiant(e)s à utiliser les technologies au niveau d'utilisation du logiciel de grossissement ZoomText? C'est moi." The other did not respond directly to the question.

Service Provider Article 2.1.3 **English cegeps in the western region**

Comments: In the English focus group, only two service providers out of the five responded directly to this question. Others implied that they did some of the teaching at various levels.

a. "I am the primary person to assist students in using the technology."
b. "Absolutely not, and if I did you'd be in big trouble."

2.2 Service Provider (Article 2.2) Comment avez-vous appris à les utiliser? / *How did you learn to use the technologies?*

Service Provider Article 2.2.1 **Self-taught**

a. "ZoomText, I learned that when it got loaded in."
b. "For things (courses) like Word, the students already know how to use it, but I took a class last year in Microsoft Office."
c. "I learn it on my own. I have a computer at home and I can bring it home, try it out. For instance, I learned to use ViaVoice that way, ZoomText, a number of other software packages."
d. Paraphrase: Il(elle) a principalement appris par lui(elle)-même, par curiosité, en posant des questions.
e. Paraphrase: Il(elle) fonctionne par essais et erreurs par exemple, quand il(elle) a tenté d'installer le grossissement de caractères par download, il a fallu le réinstaller. Il(elle) "tripatouille" le tout pour que ça fonctionne.
f. Paraphrase: Il(elle) a appris à les utiliser depuis qu'ils existent, il(elle) travaille avec les ordinateurs.
g. Paraphrase: Il(elle) possède quelques notions en informatique et fonctionne par raisonnement et déduction.
h. "I got a CCTV, and it got installed right away, but the personnel had never used it before. I wasn't there, but the student knew how to use it. So I'm going to see the student today to find out what s/he learned and then I'll learn it."
i. "There's nobody that's going to do that for you (...) if you take a course it's on your own. It's very helpful, but I don't even have the time to do that."

Service Provider Article 2.2.2 **Technicians' assistance**

a. "The technician figured out how to use it and I sat down with him/her and then I sat down with the student and showed him/her how to use it."
b. "The technicians at my institution are very helpful whenever there's technical problems."
c. "The other people I rely on again are the people from the information technology center technical staff who are very, very knowledgeable and again very willing to share their knowledge with me."
d. "The technicians at my institution are very helpful whenever there's a technical problem."

Service Provider Article 2.2.3 **Students' assistance**

a. "C'est ça, habituellement, c'était plus souvent les étudiant(e)s qui connaissaient ces programmes-là."
b. "Certainly the students are very helpful in terms of how they use the technology which they own."
c. "Little things like the trackball, I find that (students) tell me what they need."
d. "I order it and the student shows me how to do it, and then I can show other students. I really rely on them. (...)often - just to find out general information that probably 98% of them I feel they know it."
e. "The students are a tremendous asset and resource in my learning and, so much of what I've learned virtually by osmosis from the students themselves in sharing what they know, and they know so much so I rely on them a good deal."

Service Provider Article 2.2.4 **Informal exchanges with colleagues**

a. "You know, I can always pick up the phone and ask (other service providers) questions with respect to pricing."

b. Paraphrase: Quand il(elle) est confronté(e) à une question qu'il(elle) ne comprend pas, il(elle) va le poser à quelqu'un d'autre.
c. "I can ask people such as the technician, and if they don't know they will help me find out and then teach me what they've learned."
d. "As I said before, I use other personnel like (service provider at specific university)."
e. Paraphrase: "One-to-one basis" was a preferred way of learning for one service provider.

Service Provider Article 2.2.5 **Conferences**

a. "I've learned how to use computer technologies (at) conferences."
b. Paraphrase: Some of the conferences mentioned were AHEAD conference in 1995 where there were a lot of displays and a lot of available technologies: "(I) learned a lot at that conference and our informal anglophone service provider meetings. We've had sporadic times over the years. I find they're very information-packed in what's happening, what's the latest technology available."
c. "We had a conference about four years ago now at (one of the cegeps) which was on computer technology and technologies for disabled students."
d. "It was suggested that I go to an EVNET conference last year which looked on paper that it would be very appropriate, but actually it was another generation of technology that they were talking about. It wasn't the needs on a daily basis. The first day there were a few workshops, but after that it was very advanced. I was definitely out of my league in some sociological study of how people operated in a different culture from me."

Service Provider Article 2.2.6 **Internet**

a. " I think the internet is a big help."
b. "There's a lot of surfing the Web and seeing what's out there and reading up on material, etc., and then the whole issue of getting down to the manuals, reading the manuals, and trying to figure it out by trial and error."

2.3 Service Provider (Article 2.3) Comment cela a-t-il fonctionné pour vous? / *Did this work well for you?*

Summary: The following responses also review the various way that service providers learnt.

a. "There's nobody that's going to do that for you, and certainly, if you take a course like that, it's on your own. It's very helpful, but I don't even have the time to do that."
b. Paraphrase: Ils(elles) s'arrangent avec ce que qu'ils(elles) ont, ils(elles) répondent aux besoins des étudiant(e)s, mais ce n'est pas l'idéal. C'est la solution la moins facile, mais c'est ce qu'on avait, c'est plus de temps, plus d'énergie, plus de tracas pour l'étudiant(e), ce qui le(la) met en retard, ses attentes ne sont pas comblées.
c. Paraphrase: Il(elle) n'aime pas être confiné(e) dans un cours où le professeur suit son groupe; il(elle) se tourne les pouces. Suivre un cours est une perte d'heures, ce n'est pas tout le monde qui est au même niveau.

2.4 Service Provider (Article 2.4) Y aurait-il une autre façon d'apprendre qui vous aurait été utile? / *Is there some other way of learning that would have been helpful?*

a. Paraphrase: Il(elle) ne voit pas d'autre façon d'apprendre.
b. Paraphrase: Une formation sur différents types de technologies, un staff qui montrerait comment installer, s'en servir avec l'étudiant(e). "Nous, on devrait avoir une formation."
c. "Les gens qui produisent les technologies nous montreraient comment les utiliser."
d. Paraphrase: Il(elle) préfère une formation de manière ponctuelle ou l'accès à une personne ressource.
e. "I was very, very disappointed that the conference that was supposed to be held at the (rehabilitation institution) was cancelled (...) I thought it would have been great opportunity for me to just have spent a lot of time with a lot of people that needed information, that needed to try it."

f. "It really helps a lot to take an introduction to operating systems course if you're going to have anything to do with technology like this (…) You learn how to operate all types of time-saving shortcuts, whatever (…) very, very worthwhile."
g. "We had the meeting at (one of the universities), and there was one of the workshops with all of the technology. I found that to be helpful. I could have used a whole afternoon of it afterwards."

2.5 Service Provider (Article 2.5) Si vous n'assistez pas les étudiants dans l'utilisation des technologies informatiques, qui le fait? Comment ont-ils appris à les utiliser? / *If you don't assist students in using computer technologies, who does? How did they learn to use the technologies?*

Comments: Responses to the latter part of this question proved to be related to the following questions.

Service Provider Article 2.5.1 **Technician**

a. Paraphrase: "A technician in our department does (...) that's the major part of (the) job." The service provider from a cegep with large number of students with disabilities explains that given "the types of equipment (we) need (and) have, that's the primary skill a technician needs to have" and continues that "the ability to relate well to students in terms of, you know, patience and understanding and support, but second of all is the technical know-how."
b. "Le(la) technicien(ienne) les assiste dans les laboratoires."
c. "C'est le(la) technicien(ienne) ou le professeur du cours qui assiste."
d. "L'étudiant(e) a appris à l'aide du(de la) technicien(ienne) ou savait déjà comment le tout fonctionnait."
e. "Le(la) technicien(ienne) a installé(e) le logiciel d'aggrandissement. L'accompagnateur(trice) spécialisé(e), l'éducateur(trice) va assister avec ZoomText."
f. "C'est la personne qui s'occupe de l'informatique comme pour tous les autres étudiant(e)s, sauf s'il(elle) demande à ce qu'il(elle) porte une attention particulière."
g. "Je sais qu'autrefois on avait un(e) technicien(ienne) qui montrait aux étudiant(e)s comment l'utiliser, le poste a été coupé, alors là on a un(e) technicien(ienne), qui vient à temps partiel (…) Alors on donne aux étudiant(e)s l'horaire du(de la) technicien(ienne). Les étudiant(e)s qui veulent des informations, ils(elles) s'arrangent pour être là les journées où le(la) technicien(ienne) y sera."
h. "C'est le(la) technicien(ienne) qui s'occupe chez-nous de l'informatique, qui gère le réseau, donc c'est vraiment lui(elle) qui est chargé(e) d'essayer de rentrer, dans un premier temps, le logiciel de grossissement de caractères de ZoomText."
i. "À mon cégep, ça fait pas longtemps que notre service est branché, on a de nouveaux équipements, mais quant à notre problème d'informatique, on appelle souvent, le(la) technicien(ienne) vient."
j. "Quand le problème est plus pointu, il(elle) fait affaire avec le(la) technicien(ienne)."
k. Paraphrase: Le collège qui peut être autant embêté, alors il(elle) cherche une autre solution.
l. "L'étudiant(e) a appris à l'aide de la technicien(ienne)."
m. Paraphrase: Informal assistance from third person.
n. Paraphrase: À l'aide des parents, ou parfois à l'achat, l'étudiant reçoit un service.

Service Provider Article 2.5.2 **Students**

a. "(The) students are a tremendous asset and resource in my learning. And they know so much, so I rely on them a good deal."
b. "Apprentissage: Les étudiant(e)s ont appris par eux(elles)-mêmes."
c. "(L'étudiant(e)) savait déjà comment le tout fonctionnait."
d. "Les jeunes sont avancés sur les TIC, ils(elles) en font beaucoup chez-eux(elles). Ils(elles) ont commencé(e)s au secondaire, alors un bout est déjà fait."

Service Provider Article 2.5.3 **Rehabilitation centers**

a. "L'apprentissage des étudiant(e)s pour les technologies adaptatives s'est fait par le centre de réadaptation."
b. Paraphrase: Par l'organisme que le(la) répondant(e) local(e) ne connait pas.
c. "La formation est offerte par le centre de (réadaptation)."
d. "Les étudiant(e)s ont appris au secondaire ou dans un centre spécialisé."
e. "L'accompagnateur(trice) spécialisé(e), l'éducateur(trice) va assister avec ZoomText."

2.6 Service Provider (Article 2.6) Comment cela a-t-il fonctionné pour eux? / *Did this work well for them?*

Service Provider Article 2.6.1 **Overall satisfaction**

a. Paraphrase: Le(la) répondant(e) local(e) est très satisfait(e). Le Centre répond très bien; il(elle) est très content(e) de l'aide reçue.
b. Paraphrase: Il(elle) n'a pas une vaste expérience sur le sujet, il(elle) ne voit pas de problème.
c. Paraphrase: Les étudiant(e)s ne disent rien, ça répond totalement aux besoins.
d. "Cette façon répond au besoin des étudiant(e)s."
e. Paraphrase: Il(elle) est satisfait(e) de la situation, il(elle) n'a pas vraiment de problème, tout se met en place.
f. "Ça fonctionne bien."

2.7 Service Provider (Article 2.7) Y aurait-il une autre façon d'apprendre qui leur aurait été utile? / *Is there some other way of learning that would have been helpful?*

Service Provider Article 2.7.1 **Suggestion**

a. "Quand ils(elles) viennent au collège, (l'établissement d'enseignement) pourraient imposer une journée visite dans les bibliothèques et pour l'appareillage du collège; imposable à tout le monde. C'est une forme peut-être coercitive, mais c'est le moment de les arrêter pour maîtriser et utiliser le matériel qu'ils(elles) ont aussi. Il faut une personne du collège ou de l'extérieur. Il faudrait plus institutionnaliser."

Service Provider Article 2.7.2 **No opinion**

a. "Non, il(elle) ne peut pas se prononcer, l'utilisation se fait en fonction du handicap."
b. "Ne sais pas, ne connais pas."

Service Provider Question (3)

Comment votre cégep a-t-il obtenu les technologies pour vos étudiants? Jusqu'à quel point ce système fonctionne bien pour vous et vos étudiants? Mesurez le pour et le contre?

How did your cegep acquire computer technologies for your students? How well does this system work for you and your students? What are its good and bad points?

Comments: Generally, the way that cegeps get equipment and funding is through the two parent cegeps of the centralized equipment loan banks; one for the western cegeps of Québec and one for the eastern cegeps of Québec.

3.1 Service Provider (Article 3.1) Comment votre cégep a-t-il obtenu les technologies pour vos étudiants? / *How did your cegep acquire computer technologies for your students?*

Comments: 5 of the 11 service providers in the Montréal focus groups concurred.

Service Provider Article 3.1.1 **Acquisition through centralized equipment loan banks**

a. "We receive the funding from the (centralized equipment loan bank for our region)."
b. "C'est ça, (des) budgets, là, du ministère."
c. "L'équipement qu'on a nous provient à peu près tout du (parc mobile de appareils de notre région)."

Comments: Other service providers further explained the system.

d. "Funding for services for students with disabilities, as we all know, comes from DGEC and the Ministry based on a formula. Formulas understand two things: It understands that you take a student and you take a need they have, and you multiply it by a dollar figure."
e. "Actuellement à mon cégep, on fonctionne cas par cas, on n'équipera pas pendant deux, trois ans si on n'en a pas, si là on en a un, on communique avec (le parc mobile des appareils de notre région), puis on (leur) demande (...) d'avoir un prêt, quelque chose comme ça. Ceux(celles) que j'ai eus, comme je vous ai dit, qui en ont eu besoin, c'était le centre de réadaptation qui s'est occupé de ça."
f. "J'ai eu besoin d'un téléavertisseur et d'un téléscripteur, ç'a été la même procédure. J'ai appelé au (parc mobile des appareils pour notre région), ce qu'il y avait, ils me l'ont envoyé. Puis ce qui n'avait pas, ils ont fait appel au (parc mobile des appareils pour l'autre région), puis on l'a reçu dans les délais de 48 h je pense."
g. "Hé ben, moi, ça se répète un petit peu pour la visionneuse. Il y a eu un ordinateur portatif, on a fait appel ici, avec le (parc mobile d'appareils/d'équipements informatiques) et on a eu un très bon service là. Puis, c'est comme je disais aussi au niveau des ressources, dans (...) en région, en tout cas, de plus en plus, il y a des ressources qui s'organisent et nous, on peut aller chercher de l'équipement pour l'étudiant(e)."

Service Provider Article 3.1.2 **Cegep budgets**

a. "Quand on a eu besoin d'acheter la télévisionneuse, on en a fait la demande, on l'a mise dans le budget des acquisitions" (referring to their cegep's budget)."
b. "(Il(elle) a) passé par l'Aide financière pour avoir un ordinateur, mais c'est un ordinateur ordinaire là."
c. "On a aussi le programme multimédia, donc, le labo multimédia, je pense que c'est le dernier cri, mais tout ça a été obtenu, comme on disait par les ministères."

Service Provider Article 3.1.3 **Students equipped by sources outside the cegep**

a. "C'est son centre de réadaptation qui l'a aidé à acquérir son ordinateur, alors, on n'a pas participé à ça, il(elle) arrive avec."
b. "C'est l'équipement qu'on va chercher, mais c'est l'étudiant(e), tu vois, qui arrive avec son équipement aussi parce qu'il(elle) part du secondaire."
c. "Mais, c'est le(la) professionnel(elle), finalement, qui, avec l'étudiant(e), fait les démarches."

Service Provider Article 3.1.4 **Approaches to assisting students**

a. "C'est du cas par cas. Nous, on n'en a pas comme tel, puis on n'en a pas à notre compte non plus."
b. "C'est ça, les équipements sont là dans les collèges, maintenant, quand on a besoin de cas par cas, comme chose l'a dit tantôt, t'as comme besoin de technologies adaptées, ben là (les parcs mobiles des deux régions) sont là et on a là des équipements."

Comments: In region and cegeps with fewer students, service providers function "cas par cas."

Service Provider Article 3.1.5 **Ways of supplementing the system**

a. Paraphrase: One service provider indicated that, in the past, they were able to put a bit of the budget surplus from note-taking and the like aside to purchase the odd piece of equipment. However, this practice has been affected by cutbacks.

b. "We're slowly having to dig into the surplus to buy equipment. The rules are very clear, that we cannot spend the money on anything but students with disabilities."
c. Any equipment we have is bought from leftover money that we acquire via (the centralized equipment loan bank for our region), from DGEC, from the Ministry. We feel very much at their mercy. We try to acquire. We try to re-orient."
d. "There's very little extra money, and we're at the point now where, for instance, this semester we've run out of money. I'm still waiting for my cheque from (the centralized equipment loan bank for our region) from last semester."
e. "Ben, écoute dans l'ensemble quand il (le centre régional) ne répond pas puis moi j'ai l'argent, comme je te dis, j'ai pu acheter un ordinateur portatif. Si moi je vois qu'il y a une autre demande plus pressante puis que je ne peux pas avoir (...) exemple: supposons que j'ai besoin absolument de télévisionneuse, puis pour X raisons, l'étudiant(e) ne peut pas se le procurer ou peut se le procurer tardivement (et qu'il(elle) ratera) une partie de sa session, etc. Si je sens que c'est un investissement intéressant, ben à ce moment-là, je vais l'acheter là. Si ce n'est pas pour n'importe quel autre équipement. J'ai voulu acheter, par exemple, un fauteuil roulant qui n'a pas rapport avec les technologies: je n'ai pas eu besoin de l'acheter parce qu'il y a quelqu'un d'autre dans le collège, par un autre service qui l'a acheté."
f. Paraphrase: The service provider went on to explain that it is hoped that the Director of Finance doesn't give you a call to say: "You have overdrawn on your account for note taking services."
g. Paraphrase: Some of the service providers present expressed that: "it's really a situation that has deteriorated, well, with the budget cuts over the past few years."
h. Paraphrase: Also, they exchanged comments that: "(The centralized equipment loan banks) have been forced to be a little tighter on their budgets. They (the centralized equipment loan banks) are doing the best they can. (The) reality is that there's no money in the system."

3.2 Service Provider (Article 3.2) Jusqu'à quel point ce système fonctionne-t-il bien pour vous et vos étudiants? / *How well does this system work for you and your students?*

Service Provider Article 3.2.1 **Money and purchasing restraints**

a. "We don't feel that it's a lot of money available to us. There don't seem to be any special provisions for if we need new technologies or new equipment. This was true for my predecessor as well in this service."
b. "We try to hold off in buying equipment and in buying software - and especially for software because you know there's a new version out every few months. So we try to delay and get software when we absolutely need it."
c. "It's fortunate that over the years we slowly accumulated a small surplus. It didn't take the college too long to notice that. So they at one time used to pick up the salary of the technician, the college did. Now the money from Québec picks up both salaries. I think we now have union issues about weekly pays of our part-time help, etc. So I'm always a little bit nervous that it'll be working out every year. But one year we're going to find ourselves in a deficit situation."
d. "Well, you know, not that great. Because we never know, also, how much we're going to get in terms of money from the Ministère."

Service Provider Article 3.2.2 **System is working well**

a. "Ç'a été aussi simple que ça, mais pour les équipements, à date, que je me suis procuré, ç'a été très simple. Donc, si ça peut fonctionner encore comme ça, ça va bien."
b. "Moi, j'ai trouvé ça excellent."
c. "J'avais téléphoné au (parc mobile des appareils pour notre région) et ensuite j'ai rappelé les familles et ils m'ont dit : '(...)il(elle) en a pas besoin, le centre de réadaptation ont mis tout ça à la maison, ils vont même en donner un en double pour le cégep, etc.' Bon! Alors, il fallait envoyer le camion du cégep chercher l'instrument et c'est tout, puis le placer dans le centre des médias."
d. "Je pense qu'on est bien équipé."
e. "Oui, ben, je pense qu'on a généralement les ressources nécessaires."

f. "D'autres façons d'aller chercher l'équipement, tu sais ils vont me dire: 'Bien non, telle chose, l'étudiant(e) doit faire ses propres démarches à tel endroit.' Finalement, je deviens comme une personne-ressource pour l'étudiant(e). Donc oui le (parc mobile des appareils pour notre région) pour nous autres, c'est primordial là, c'est comme notre Bible."

Comments: These last comments come primarily from service providers in the regions.

3.3 Service Provider(Article 3.3) Mesurez le pour… / *What are its good points…*

Comments: A number of service providers did not respond to this part of the question; the majority of responses came from cegeps which have fewer students. The responses tend to reflect this disparity. Among those who did respond, there seemed to be agreement.

Service Provider Article 3.3.1 **No problem**

a. "Il ne me semble pas qu'il y ait de problème."

Summary: Some participants said that they base their impressions on what students say and that students seemed satisfied.

b. "Moi, en tout cas, l'élève semblait bien, bien satisfaite là, parce que j'ai revérifié une fois que c'était installé tout ça. Puis (…) je trouve que le téléavertisseur, c'était pour un examen, c'était très sporadique."

c. "Ça bien fonctionné, il(elle) a peut-être trouvé que c'était un ancien, un ancien modèle, mais il(elle) a pu faire son examen (avec un) portatif, apparemment, peut-être que c'était pas ce qu'il y avait de plus intéressant là, c'était fonctionnel."

d. "En tout cas, je dirais que le pour (…) je vois un grand avantage à faire affaire avec le (parc mobile des appareils) à savoir que si on a besoin d'une technologie qu'ils puissent, eux, nous la procurer; que c'est très logique que ce soit eux qui nous procurent un matériel très spécialisé sous forme de prêt. Parce qu'un(e) étudiant(e) qui est ici pour une session peut ben sacrer son camps la session d'après, puis cette technologie-là, il ne faut pas qu'elle poireaute dans un cégep, donc on la retourne au (parc mobile des appareils) puis elle peut être utilisée par une autre personne. Donc, moi, je pense que c'est la seule façon au niveau technologique, moi, je promeus plus que ce soit le (parc mobile des appareils) qui fournisse les appareils dont on a besoin."

Service Provider Article 3.3.2 **What helps**

a. Paraphrase: One participant suggested that teachers be involved in the training of students: "Puis l'autre élément, c'est que, c'est un peu une configuration de tout ça, les professeurs du département d'informatique sont impliqués dans la formation et la recherche. Ce qui fait que (…) comme j'avais un(e) étudiant(e) qui était en informatique qui a pu profiter de l'expertise des professeurs."

b. Paraphrase: One participant expressed how they have found means to meet the needs of the student: "Il y a un(e) étudiant(e) qu'il faudrait adapter, mais on s'y ferait tout simplement. On analyserait son besoin et sûrement qu'il y aurait une réponse favorable dès le départ."

c. "Bon, les centres de réadaptation, ils sont bien placés pour entraîner ces jeunes-là."

d. "On est assez bien équipé là-dessus"

e. "On renouvelle les ordinateurs avec les dernières technologies disponibles selon les budgets disponibles aussi."

3.4 Service Provider (Article 3.4) Et mesurez le contre? / *What are its bad points*

Service Provider Article 3.4.1 **Lack of knowledge**

Summary: Some service providers professed a lack of knowledge about technologies and resources available.

a. "Parce que moi je ne connais pas ça, moi (...) je ne connais rien à l'informatique, tu sais. Je ne suis pas au courant de toutes les adaptations possibles avec tous les logiciels, je ne connais pas ça. Je peux juste acheminer les demandes au point de vue administratif et évaluer les besoins de quelqu'un, remplir les formulaires, soutenir la motivation, rencontrer les professeurs, interpréter les besoins, mais l'informatique, je ne connais pas ça. Moi, je préférerais qu'on ait tous un équipement dans nos centres de médias."

b. "Moi je dirais peut-être un (...) En tout cas, je ne suis pas correcte là, je ne le suis pas, mais je vais le dire pareil, ce que je trouve peut-être qui nous manque le plus, en tant qu'intervenant, c'est connaître les ressources qui existent, savoir que tel appareillage existe pour telle personne, c'est peut-être ça qui nous manque le plus quand l'étudiant(e) n'est pas suivi par un(une) professionnel(elle)."

Service Provider Article 3.4.2 **Time consuming**

Summary: One service provider says that the time that it takes for students to get the equipment creates barriers:

a. "Alors, donc, des fois, l'handicap, c'est la période de temps que ça prend pour avoir l'appareil."

Service Provider Article 3.4.3 **How the system works**

a. "Because we have a lot of students, some taking one course, some taking seven or eight courses, we get our budget, and that is supposed to pay for my salary as coordinator and as provider of services to students. It doesn't pay for a technician, and it doesn't pay for any equipment."

b. "So how well does this system work? Well, you know, not that great. Because we never know also how much we're going to get in terms of money from the Ministère."

Service Provider Article 3.4.4 **Changing situation**

a. Paraphrase: "A tightening up of the rules and regulations in the past few years has reduced even the funds that we've been able to receive." The service provider explains that now the office for students with disabilities is in a situation "where really there's no extra money at all."

b. "We never know, how much we're going to get in terms of money from the Ministère. We usually find out months after we have sent in our 'individual education plans' to the (centralized equipment loan bank for our region), there's this long delay between when we send in our information, and when we actually receive a cheque. So for this semester, for example, I don't expect to see any money until probably sometime late April. (This) will be helpful, of course, for the autumn semester. But (it's) not very helpful for now."

c. "There don't seem to be any special provisions for if we need new technologies or new equipment. We try to acquire. We try to re-reorient."

d. "So what I'm experiencing now is a situation where really there's no extra money at all."

e. Paraphrase: Un(e) des répondant(e)s local(e)s a souligné(e) les projets à venir "mais ce qu'on est en train de se rendre compte, c'est que ça évolue très vite. Et dans quelle mesure les institutions et les services sont-ils capables de suivre le rythme de cette évolution-là? Nous, on est rendu avec Windows NT, les logiciels de grossissement de caractères suivaient. Bon, qu'est ce qui va être la suite? Je le sais pas encore, je sais que notre (certains départements) à nous, ça va changer, puis là, ça sera la création de documents, ça va être la conception de dépliants. C'est comme si la limite est devenue très mince avec l'infographie pour (ce) qui va changer chez-nous. Jusqu'à quel point le logiciel qu'on a actuellement va être encore bon pour cette personne, je pense que ça ne le sera plus."

f. "Ça dépend de l'étudiant(e). Comme une personne sourde, en anglais, à la maison, peut prendre du temps avec un appareil très fort pour qu'il(elle) puisse entendre. Il y a un moyen pour s'arranger. Comme un moment donné, un(e) étudiant(e) qui avait une paralysie cérébrale, il(elle) ne pouvait pas parler en anglais, mais il(elle) pouvait écouter, il fallait qu'il(elle) parle, mais il(elle) ne pouvait pas parler, il(elle) prend un laptop, puis il(elle) écrit les réponses."

Service Provider Article 3.4.5 **Limited number of students/needs**

a. "Mais, là-dessus on a quand même un petit peu de sous que ça aide, mais on y va avec les demandes. On n'a pas un parc d'outillage. On n'ira pas s'équiper, si on ne voit pas une nécessité. Puis pour voir les nécessités, c'est l'étudiant(e) qui nous aide, en nous expliquant qu'est-ce qu'il(elle) a de besoin. Parce qu'on, on ne peut pas nous autres faire l'évaluation nous-mêmes. On n'est pas formé(e)s pour ça. L'utilité que l'étudiant(e) va en faire, la longueur, la durée, si l'étudiant(e) a besoin d'un équipement pour un mois, puis que je ne vois absolument pas que dans mes années antérieures, ça ne m'a jamais été demandé, ben peut-être que je n'achèterai pas l'équipement, peut-être je vais essayer d'avoir un prêt, ou je vais essayer autre chose, ou je vais essayer de trouver une autre solution que d'acheter un équipement qui va être bon juste pour un mois. On trouve une autre alternative là."

Service Provider Article 3.4.6 **Limited equipment**

a. "Puis ça pourrait être étendu, dans le sens où si j'avais une recommandation à faire, si vous jugez, suite à votre sondage, qu'il y a un besoin en technologies puis qu'il y a un manque de ressources, ben je pense qu'il faudrait que le (parc mobile des appareils) ait plus de budgets point. (Qu')une enveloppe qui soit prévue pour ça au (parc mobile des appareils), pour rentabiliser au maximum, pour pas éparpiller l'argent."

Service Provider Article 3.5.7 **Lack of money to pay for services**

a. "Je vais donner un exemple. Quand, quand on engage un(e) preneur(euse) de notes, pour certains cours, on a 500 $ par étudiant(e) handicapé(e). Pour certain(e)s étudiant(e)s, c'est bien, puis c'est correct; pour d'autres, des fois, on a l'impression qu'on demande beaucoup de bénévolat aux étudiant(e)s. Tu sais, des fois, on a l'impression qu'on exagère un peu."

b. "I think that there's a lot of things that are happening down in the States, and yet the cost of going to conferences in the States is really prohibitive. So I think it's a question of how could we do more "in service" without the danger of travelling costs."

Service Provider Article 3.4.8 **Reallocation and lack of money**

a. "I think that's one of the things that the funding we have to clearly identify (is) (...) how much we can do as institutions. Can we deal with learning disabled, attention-deficit, the this, the that, and so on? I'm not sure. I think we're going to have to make choices down the road."

b. "We tend to just scrape money together from things like placement testing, a fee that is charged to students, money is handed over to us and we make use of it as we see fit. Really, it's a sad state of affairs where we are in."

c. "Money is a big problem for us. So really I know what's available out there, and I know what they can do really we can't afford all these technologies. So we have very little (technologies)."

d. "Our Learning Center has no budget. Literally no budget (...)"

e. "(A) student told me that his/her system cost him/her in the range of $10,000, which frankly I can't afford, can't even come close to buying even a fraction of these items. In fact, I'm lucky if I can scrape up enough to buy Dragon Naturally Speaking."

Service Provider Question (4)

Y a-t-il des programmes de subvention disponibles pour aider les étudiants à acheter ou à louer les équipements matériels? Si oui, lesquels? Que ressentez-vous face aux programmes de subvention disponibles pour les étudiants – mesurez le pour et le contre?

Are subsidy programs available to assist students with disabilities to buy or loan computer equipment? If yes, which programs? How do you feel about the subsidy programs that are available to students - what are their good and bad points?

4.1 Service Provider (Article 4.1) Y a-t-il des programmes de subvention disponibles pour aider les étudiants à acheter ou à louer les équipements matériels? Si oui, lesquels? / *Are subsidy programs available to assist students with disabilities to buy or loan computer equipment? If yes, which programs?*

Comments: In this section of the question, service providers seemed to be less aware of existing programs, while some clarified for us that they are not directly responsible for this service.

Service Provider Article 4.1.1 **Not aware or do not deal with programs directly**

a. "Moi, les programmes de subvention, je ne les connaissais pas, je me serais référé(e) ici pour le savoir."

b. "Ça fait que dans ce sens-là, je, je suis un peu embêté(e) parce qu'on dirait que je, je ne fais tellement pas appel souvent que je ne peux pas l'évaluer le programme."

c. "Pour ce qui est des autres programmes, souvent, je vais référer l'étudiant(e) à l'Aide financière de notre collège qui est en contact avec ces types de subventions-là; plus, les bourses (et) les prêts je crois. Mais pour l'achat d'équipement, je ne suis vraiment pas familier(ière) avec ça, c'est vraiment l'Aide financière qui va répondre à ces besoins de ces étudiant(e)s-là."

d. "Whether or not there are specific programs for students with disabilities to receive financial aid is an area that I have not had an opportunity to look into yet, and I will be, and I'm maybe also relying on you for feedback on that. On you people who have been doing this a little longer than I have. So really I'm not prepared to speak on that point at this time."

e. "Pour l'équipement informatique, j'imagine qu'il faudrait que la personne en question à qui je pense là s'adresse aux mêmes endroits (Aide financière), mais sinon, bien, moi, ça m'intéresserait de savoir si vous en connaissez d'autres. Il y a d'autres endroits? Oui, ah alright!"

Service Provider Article 4.1.2 **Are aware of and deal with programs directly**

a. "En fait, moi, je n'ai pas utilisé rien, la seule subvention qui a été utilisée, c'est pour que mon étudiant(e) handicapé(e) puisse acheter un ordinateur."

b. "On fouille, on utilise un peu notre, notre imagination, puis on fait des contacts puis on finit par obtenir des choses. Ou on réfère l'étudiant(e), au besoin, à ces endroits-là."

c. "L'annexe F-062 du Ministre de l'Éducation : la liste des équipements qui existent dans le réseau, et ça, on nous en a remis une copie hier, une mise à jour, et le guide du plan d'intervention pour les personnes avec déficiences. Dans l'annexe F-062, vous allez retrouver tous les éléments pour le support d'aide financière pour les personnes ayant des déficiences. Chaque dossier est aussi étudié, même si on monte plus haut dans la structure, (il est) aussi étudié en fonction du besoin qui est là. Il y a des normes de base, mais il y a toujours des situations qu'on doit adapter. Je pense que dans chaque cas qu'on a, autant on a des cégeps, autant on a de la qualité, autant on a des personnes qui ont des besoins différents."

d. "Ben, les programmes, on les a mentionnés, celui avec lequel je suis le plus familier, on en a discuté, c'est celui du collège ici."

e. "Bon, oui, il y a des programmes de subventions."

f. "Nous, ce n'est pas les collèges. C'est ça qui diffère là dans les acquisitions (d'équipements)."

Comments: A few service providers who were informed discussed in general terms their views of both government and private subsidy programs.

Service Provider Article 4.1.3 **Loans and bursaries or financial aid**

a. "Les étudiant(e)s quadraplégiques, il me semble que c'était par l'entremise des prêts et bourses qu'ils(elles) avaient obtenu leur ordinateur, mais je ne suis pas certain(e)."

b. "If you look at the loans and bursaries, in order for a student with a major functional disability to be eligible for loans and bursaries, they must fall into the same categories and criteria as any other student, where they look at parental income, etc. Except if they are eligible, they will get a bursary rather than the loan. So what I suggested is the students apply for computers under that special form with equipment, etc. But I think some of our students have gotten it. I just don't know if they were already eligible for loans and bursaries to start with. But we had a student a couple of years ago who had (a disability) and the OT wrote a strong enough letter, and s/he got his/her computer.”

c. “Comme l'exemple de l'ordinateur, c'est pour acheter avec les prêts et bourses. Quand c'est en lien avec la, le profil du cours.”

d. “Quand je, j'ai offert à mes étudiant(e)s, je leur explique que les subventions, les affaires étudiantes, ils(elles) ont droit à une subvention de 3000 $.”

e. “Aside from help from the (designated institution) and other financial aid services, I haven't learned anything specific about subsidy programs.”

Service Provider Article 4.1.4 **Other financial aid and government programs**

a. “Right now, I learned a week and a month ago that I should be checking with the OPHQ. I have been told by an individual who seems knowledgeable. The OPHQ is making money available to students with disabilities via the CLSC. Now that may mean absolutely nothing, but it's something that I'm hoping to dig a little deeper into. So I know the OPHQ makes funds available, but I have not ever seen that via the CLSC. It's something that I'm going to look at. Funding from our end of the thing - it has not been a problem.”

b. “Puis l'autre ç'a été la Régie de l'assurance qui a payé.”

c. “Les programmes dans lesquels un(e) étudiant(e) (...) l'assurance, l'assurance accident, la RAMQ pour la majorité, l'aide financière aux études. Chez-nous on a placé, on a fait une demande à la fondation du collège pour acquérir le logiciel qu'on parlait, il me semble une possibilité.”

d. “D'abord, il y a l'Aide financière d'une part, puis ensuite, je dirais ça dépend du statut de chaque étudiant(e). Par exemple, si c'est un(e) étudiant(e) qui est sous la CSST (...) (ou par) l'Assurance automobile du Québec, une somme d'étudiant(e)s nous viennent, par exemple, du (Centre de réadaptation), effectivement, ça dépend des provenances et selon le vécu de chaque étudiant(e), ben là on va aller cogner à la porte des subventionnaires, OK? Ensuite, on sait que, par exemple, on mentionnait, que tu as des clubs comme le Kiwanis, le Club Richelieu, etc. Tu as tout un ensemble de clubs sociaux qui peuvent, eux, nous venir en aide.”

e. “À part ça, c'est sûr ici qu'il y a des programmes différents (...) quand l'étudiant(e) veut avoir son ordinateur personnel, il(elle) fait affaire aux prêts et bourses ou à son organisme. OK. Comprends-tu, fait que, ce qui fait que, moi, je vais juste avec les étudiant(e)s que, je vais aller, juste qu'ils(elles) ont besoin d'un(e) preneur(euse) de notes ou les ordinateurs réguliers par l'Aide financière, donc je ne connais pas rien d'autre.”

f. “I know that there are students in the OST program and the computer science program that are able to go through the provincial loan system to get a computer. It's not always, you know, it's not every two years. I'm not sure what the amount of time is even if their technology wasn't sufficient. And I know of a student that had to wait, but apart from that I don't know any other, apart from what you've just said in terms of equipment, concerning like the (designated institution).”

g. “Habituellement, l'étudiant(e) sait d'après son association à laquelle... il(elle) fait appel à son association de personnes qui ont son handicap, tu sais ils(elles) sont regroupé(e)s. Et là des fois, c'est eux autres qui vont lui dire où s'adresser, à la RAMQ, à la ci, à la ça. Mais, ce n'est pas moi qui leur dit ça, c'est cette part-là des choses. Et habituellement ils(elles) sont au courant ou bien non ils(elles) vont dire ça 'Ah! Je vais appeler à mon association, je vais appeler à l'institut'!”

Service Provider Article 4.1.5 **General comments**

a. “Bien, moi, je ne connais pas beaucoup ça là, mais je sais qu'on a reçu une demande d'un(e) étudiant(e) qui voulait avoir une modification sur son véhicule, son quatre roues, là, et puis je ne sais pas si ça s'applique pas directement à l'achat d'équipement matériel technologique et peut-être encore que oui. Je le sais pas. Ce que je peux vous dire c'est que la démarche qu'on a fait, c'était auprès du CLSC, d'une ressource qui s'appelle, d'un groupe ou d'une institution qui s'appelle X, qui s'occupe de la réadaptation, CLSC et le programmes de prêts et bourses. À ma connaissance, ces trois institutions sont les trois endroits où on peut adresser une demande pour obtenir possiblement des sous pour une adaptation de matériel de base, de déplacement."

b. "Il y a de plus en plus de ressources. Bon, ça peut venir par les centres de réadaptation qui, eux, ont des références souvent à nous donner là-dessus. Ah! Il faut qu'on, il faut qu'on utilise."

c. "Moi, je pense qu'à date, j'ai eu affaire peut-être une fois avec le centre."

Comments: It seems that there are discrepancies in the information that different service providers have about programs available to students with disabilities. In addition, service providers do not appear to be up to date with regard to the programs available

4.2 Service Provider (Article 4.2) Que ressentez-vous face aux programmes de subvention disponibles pour les étudiants? / ***How do you feel about the subsidy programs that are available to students?***

Service Provider Article 4.2.1 **Some service providers were very satisfied with the programs**

a. "Très content."

b. "Ben, c'est des subventions qui permettent d'avoir ces équipements-là. Je trouve ça extraordinaire ces ressources-là, les disponibilités, il n'y a pas de barrières trop, trop. Tu ne vois pas de problèmes vraiment majeurs à ce niveau-là."

c. "Ça satisfait tellement mes besoins à moi pour l'instant là."

d. "Je trouve que les programmes sont, je les trouve bien adaptés, qu'ils répondent aux besoins (...) les cas par cas, individuels."

Service Provider Article 4.2.2 **Lack of detailed knowledge**

a. Paraphrase: Les répondant(e)s locaux(ales) qui ne desservent pas à titre du programme d'aide financière nous informe que: "ce n'est pas nous qui l'administrons à titre de responsables de la clientèle handicapée, parce que l'étudiant(e) qui a besoin d'aide financière, il(elle) va au Service de l'aide financière. On n'est pas nécessairement les mêmes personnes. Donc, on ne connaît pas, dans les programmes d'aide financière, ce qui peut s'appliquer ou non. Sauf que comme j'exposais tantôt au moment où on en a eu besoin, ça s'est passé de façon extraordinaire, c'est-à-dire que l'étudiant(e) a reçu(e) tout ce qu'il(elle) avait besoin en terme de niveau d'équipement, il n'y a pas eu de discussion, la demande était là, puis Québec a fait ce qu'il fallait. Alors, je présume que ça doit répondre convenablement, j'imagine, mais là, je ne connais pas tu sais, les critères qui jouent."

Service Provider Article 4.2.3 **Individualized services**

a. "(Selon l')Aide financière et avec ses besoins à lui(elle), il(elle) a demandé(e) une souris adaptée, tu sais, il(elle) a demandé(e) des besoins, et, puis, il(elle) l'a eu(e) cette subvention-là. Puis, il(elle) semble très satisfait(e)."

Summary: As a general rule, service providers don't like to propose solutions to students. Service providers don't believe that their own evaluations, solutions, or suggestions would be valuable as these may not even meet the students' needs and because they aren't always fully aware of what is available. They think it is better for students to approach service providers with their requests.

b. "Je vais être plus apte à répondre à un besoin spécifique que l'étudiant(e) va manifester que moi lui offrir quelque chose parce que, comme on est pas tous), on n'a pas que ce dossier-là dans notre bureau, je ne me vois pas apte à savoir que tel logiciel ou tel matériel existe pour ses besoins. Alors, si lui(elle), il(elle) me dit: "Je veux telle chose." Là, je vais y répondre ou je vais communiquer avec le(la) répondant(e) local(e) central(e) et je vais lui dire: "Regarde, l'étudiant(e) a tel problème, que peux-tu me suggérer?" Je me vois mal, moi, être à la recherche de ce qu'il(elle) a besoin."

c. "Ben, je ne serais pas bien dans ma peau, d'arriver et de lui dire: 'Tiens, ça va te prendre telle affaire et telle affaire.' Je ne le(la) connais pas. Parce que je l'ai eu, je ne l'ai vu, alors que j'en ai pas eu besoin chez-moi. Fait que, c'est pour ça."

d. "Comme je dis, comme l'autre répondant(e) local(e) le disait, à date, je n'ai pas eu personne qui a été refusé pour quelque chose qui (...) j'aurais été ben frustrée, fait que, à date, ça correspond à mes besoins, à mes attentes..."

e. "Je dirais que dans les onze dernières années, quand il y a eu un besoin au niveau scolaire, je ne peux pas dire au niveau de sa vie personnelle, au niveau du scolaire, on a toujours réussi avec les subventions existantes là à y répondre au niveau d'appareil."

Service Provider Article 4.2.4 **Different perspectives on programs**

a. "C'est sûr qu'idéalement là, si on avait plus d'argent, on pourrait faire plus et on pourrait faire mieux. Mais, on est, c'est comme ça, on y va avec notre bonne volonté, puis on fouille, puis je pense que finalement, les étudiant(e)s aussi apprennent beaucoup. Puis, est-ce que c'est bien? Ben, c'est sûr que si on avait plus de sous là."

b. "Sauf que des fois, on a aussi l'impression de quêter. En tout cas moi, j'ai cette impression-là. C'est ça que je dis, si on avait plus d'argent, ben il y a des fois où (...) mais l'argent, ça n'ajuste pas tout non plus, tu sais."

c. "Fait que c'est sûr que l'idéal, ça serait qu'on soit au courant de toutes ces technologies, que ces technologies-là aient un local où rapidement on pourrait donner du service. Mais je pense qu'il (en) y a pas de disponible pour ça, en tout cas."

d. "Moi je ne suis pas au fait non plus à part les subventions par les collèges désignés (parcs mobile des appareils), c'est à peu près juste ça avec quoi je fais affaire."

e. "Moi, des fois, c'est les dates qui sont contraignantes quand on fait une demande (...) bon, c'est le 31 mars là, après, c'est fini, il faut attendre l'autre période. Alors ça, je trouve ça dans les contraintes, il faut vraiment avertir l'étudiant(e), lui dire: 'Tu fais ça avant la date.' Bon, OK, la longueur du cheminement de la demande. Des fois on tombe sur des fonctionnaires un petit peu plus pointilleux, un ç'a passé, l'autre c'est pas la signature. Ben, des fois, ça ne va pas toujours assez vite dans le règlement de l'appareil."

f. Paraphrase: Les demandes sont traitées selon la façon dont les étudiant(e)s "manifestent leurs besoins."

Service Provider Article 4.2.5 **Informing students of their options**

a. "Souvent, l'étudiant(e) ne sait pas qu'il(elle) pourrait avoir besoin de services, qu'il(elle) peut avoir accès à 3000 $ pour pouvoir avoir accès à un portatif." C'est aux répondant(e)s à dire: 'Tu as des prêts, des bourses pour avoir un ordinateur portatif qui te permettrait d'alléger ton travail, si tu veux'."

b. "Alors, effectivement, quand on a la panoplie de tous les organismes qui existent, on essaie de faciliter à l'étudiant(e) (par) des subventions."

4.3 Service Provider (Article 4.3) Mesurez le pour et le contre. / *What are their good and bad points?*

Service Provider Article 4.3.1 **General perspective**

a. "Je suis pour ces programmes-là."

b. "Que ressentez-vous face aux programmes de subvention disponibles? De ce que j'en connais, ben c'est sûr que je suis pour ça là (...) si ça permet à ces étudiant(e)s-là, d'être sur un point d'égalité là, si on peut s'exprimer ainsi, avec les autres étudiant(e)s, ça pallie un manque qui se donne, on ne peut pas être contre ça. Mesurez le pour et le contre? Je n'ai pas vraiment de commentaire là-dessus là pour évaluer les choix."

c. "Mais (...) je pense, en tout cas c'est mon avis, on a tendance à faire des sondages pour essayer de blâmer, mais je trouve que le message, la réponse est quand même bonne. Comme tu m'as dit au début, je t'ai demandé un come back puis tu me disais que la réponse allait (...) en tout cas on répond assez bien à mon avis, actuellement, aux besoins en technologie. Je dirais assez bien. Il y a toujours place à l'amélioration, mais peut-être que les étudiant(e)s ne manifestent peut-être pas assez tous leurs besoins. On est peut-être pas au courant de tous leurs besoins là, mais en général, on répond assez bien."

Service Provider Article 4.3.2 **Progress made to date**

a. "Je pense (que) ce qui existe actuellement, le pour et le contre, c'est que c'est un projet de société, c'est que la société veut aider, elle veut que les handicapé(e)s fassent une vie normale, dans la mesure où ce projet de société là est soutenu que ça va se développer. Mais par rapport à ce qui se faisait il y a trente ans, je pense qu'il y a un effort extraordinaire par rapport (à) la différence, c'est déjà accepter la différence."
b. "De mon point de vue, il y avait une demande, il y a eu une réponse, un service, ça m'apparaît correct."
c. "Bon, on fouille, on fouille pour aller connaître tout ce qu'on peut aller chercher ou (s') il y a des choses qui sont du temps perdu."
d. "Tu sais, je veux dire, ce n'est jamais la perfection, c'est ben sûr qu'on voudrait avoir encore plus de possibilités."
e. "En tout cas, (il répond) plus ou moins (à) ce qu'il voulait. Des fois là, ce n'était pas exactement le montant complet."
f. "Moi, ben, je ne le sais pas, ce que j'entends parler des fois des étudiant(e)s handicapé(e)s, c'est que (...) quand ils(elles) ont acquis un équipement personnel, soit par les prêts et bourses, soit par un organisme, ils(elles) ne peuvent pas avoir un deuxième équipement. Et on sait, ça évolue beaucoup dans le domaine de l'informatique. Ça, ça serait peut-être dans le domaine du contre. Il y aurait peut-être une lacune à combler."

Service Provider Article 4.3.3 **Conflicting sources of assistance**

a. "The other issue we have (is) with students who need to stay on Bien-être Sociale because the funding is better than Prêts et Bourses. And yet, a student that's on Bien-être Sociale, they're down to six hours or two courses, and so they're going to take many years to graduate."

Service Provider Question (5)

Quel développement aimeriez-vous voir dans ce domaine?

What would you like to see happen in this area?

5.1 Service Provider (Article 5.1) Quel développement aimeriez-vous voir dans ce domaine? / *What would you like to see happen in this area?*

Service Provider Article 5.1.1 **Cannot foresee future developments**

a. "Je ne peux voir les développements. Donc, c'est ça, je n'en vois pas."
b. "Autant au (niveau du) développement technologique que développement là, c'est aussi difficile parce qu'on répond aux besoins."

Service Provider Article 5.1.2 **Financial**

Summary: Several service providers mentioned that they would like to see a broader range of financial support made available to students.

a. Paraphrase: In this area, a service provider suggested that a program from the government be offered to provide up-to-date technologies in these areas: "Very simply, I'd like to see some money available, perhaps in the way that some monies have been made available in the academic sectors through NTIC grants. For all the cegeps."
b. Paraphrase: Another service provider was very specific about the needs for financial support: "I'm wondering if it would not be interesting to see that the monies that have been earmarked for that be focused more towards dealing with the learning disabled problem. I think that we're talking of a different thing between somebody who's learning disabled and somebody who is there, finished

high school with an overall average of 59.2% and so forth. I'm not sure we're putting the money in the right place."

c. "On souhaite, tout le monde, de développer des choses, que ce soit technologies adaptées ou technologies tout court, d'information (...) chez-nous, chez les étudiant(e)s, on a plein de projets, plein de demandes et malheureusement (le) côté contextuel vient freiner ta demande. Donc, vu du contexte, ce n'est pas toujours évident là, tu sais, de renouveler et de développer des nouveaux aspects. On est toujours bugguer sur des mesures budgétaires restreintes, contexte actuel dans tous les centres d'activité. Ce n'est pas juste."

Service Provider Article 5.1.3 **Training**

Summary: The idea of training seems to have the support of three service providers.

a. "(...)as well as training opportunities for supporting use or technicians."

Service Provider Article 5.1.4 **Standardized loan programs**

a. Paraphrase: One service provider suggested the adoption of a program: "like the one in British Columbia." However, s/he expressed concern about the procedures: "My big concern would be who would run that system and if it's too far removed from the students and the institutions, it might create a situation where they don't lend us out what we need. That's what I want to see more about. What is working or what isn't working in British Columbia."

b. Paraphrase: The service provider also wonders how adapting the loan system like the one in British Columbia "would affect the system that exists presently in Québec, since at present, we have students who get equipment."

c. Paraphrase: Un(e) répondant(e) local(e) répond qu'il est difficile d'établir une procédure fixe tout en répondant bien aux besoins: "On ne pourrait pas arriver et dire: 'Voici le programme, tout est là, tout est là.' Même si on voulait le planifier, parce qu'on aura toujours des adaptations à faire ou il y aura toujours un bout de la procédure qu'il faudra tordre quelque part et là, on se fera fonctionnaliser et là, on aura des difficultés à opérer et à répondre aux besoins. Je crains de dire, on va arriver avec un programme national, bravo: 'Ben ton cas, il ne passe pas, parce qu'il accroche avec l'alinéa 28, du paragraphe 17 (...) J'aime ben mieux arriver comme ça puis dire (...) c'est sûr que ça ne fait pas une belle promotion, de dire: 'nous répondons, nous pouvons répondre (...)' Mais, au moins, quand c'est le cas par exemple, on peut le faire. Et je sais pertinemment que, pour le peu de normes qui existent, quand on a eu besoin de les défoncer, on les a défoncées. Si on fait tout un protocole pour un cas qu'on vit dans un programme X, l'année suivante, on démolit ça parce qu'une personne avec les mêmes besoins, mais il(elle) s'en ira dans le programme Y. Là, ça ne fonctionnera plus du tout. Moi, je ne peux pas te dire, je ne peux pas prévoir."

d. Paraphrase: Un(e) participant(e) souhaite l'uniformisation des procédures: "C'est peut-être (...) une facilité de l'étudiant(e) au niveau du cheminement dans le réseau de l'éducation, que ce soit au secondaire, collégial, universitaire, que ça soit plus uniforme. Là tu sais, on change de niveau, ben on change de procédure, l'universitaire fonctionne de telle façon, le collégial. On pourrait peut-être uniformiser les démarches des jeunes."

e. Paraphrase: A service provider expressed the view that despite the fact that students get equipment, this equipment "doesn't meet their needs a few years down the road." Likewise cegeps' equipment "doesn't meet our needs, but might meet the needs of someone else elsewhere. If we had a good loan system where people could (...) It's like moving that way to leasing cars nowadays too, where you circulate it through a system."

f. "Développement (...) ben c'est sûr que si on avait des prêts d'équipements plus facilement, on peut obtenir, comme exemple, supposons que ça serait centralisé au (parc mobile des appareils) si le (parc mobile des appareils) possédait encore plus d'équipements qu'il puisse nous prêter (...) peut-être que ce serait intéressant, parce que là, en ce moment, je te disais, on a un tout petit peu d'argent, c'est vrai, mais ce n'est pas quelque chose de nécessairement récurrent là. Je ne peux pas compter toujours, moi, sur un budget. Qu'est-ce qui me dit que dans trois ans je vais avoir besoin de tel équipement ou que je n'aurai pas l'argent là parce que je vais rencontrer telle ou telle demande. Faire un développement comme tel, dans mon cégep (...) je ne vois pas

comment je pourrais demander au collège d'acheter de l'équipement. C'est pour ça que, j'ai commencé à répondre à la question et les possibilités de prêts parce qu'il y a pas gros d'investissements à ce moment-là de ma part."

Service Provider Article 5.1.5 **Problems with renewals and updates of equipment**

a. "Je pense à ce que (l'autre répondant(e) local(e)) a dit tantôt, il y a peut-être lieu de faire une remontée au ministère pour faire un assouplissement que ce soit au niveau des annexes budgétaires. Dans le sens que, lorsqu'il y a une problématique au niveau du renouvellement d'équipement parce que la technologie est allée trop vite, à ce moment-là, qu'il y ait un assouplissement au niveau de ces règles budgétaires là. Je ne suis pas au fait là (...) parce qu'il y a des budgets qui ont été débloqués au niveau des NTIC qu'ils appellent, les nouvelles technologies d'information et de communication, je ne sais pas s'il y a un volet particulier pour ces choses-là, mais il y aurait peut-être lieu parce qu'il y en a beaucoup d'argent de ce côté-là. Il y aurait peut-être lieu de défoncer ces barrières-là pour que ça soit plus adapté aux besoins des gens, compte tenu de la rapidité avec laquelle ça devient désuet. "

b. "Moi, c'est vraiment dans le même sens parce que là, on parle de toute sorte de technologies hein? Mais là, pas seulement informatiques, mais (...) je sais, il y a un(e) étudiant(e) handicapé(e) visuel(elle) qui avait un système, ça fait déjà plusieurs années, il(elle) est retourné(e) le mener à je ne sais plus trop quelle association, puis de toute façon les subventions, c'est gouvernemental et puis (...) il(elle) ne pouvait pas avoir un autre système parce qu'il(elle) en avait déjà un. Et je pense qu'à ce moment-là, il faudrait se pencher pour réévaluer la situation à la lumière des nouvelles technologies, de l'évolution du handicap aussi."

c. "Moi, ce que j'aimerais voir, c'est un peu, ç'a été dit tout à l'heure par rapport au renouvellement peut-être, un renouvellement assez facile du nouveau matériel parce qu'on disait qu'à partir du moment où un élève a besoin d'un ordinateur, ben il(elle) est pris avec je pense pour un bon bout de temps. Puis, Dieu sait si ça évolue rapidement et c'est vite dépassé."

Service Provider Article 5.1.6 **Access to information regarding subsidy programs**

a. "Ben, je reviens à ce que les deux derniers ont dit dans le sens de facilité l'accès à ces subventions-là, à nous les faire connaître du moins."

b. "C'est (qu') il y a vraiment beaucoup de manque (comme au sujet de) la subvention de matériel (...) il y a beaucoup de monde, beaucoup d'organismes, je ne me souviens pas si on peut regrouper ça et avoir de l'information dans les mains qui serait comme plus claire parce qu'il semble qu'il faut qu'on court à gauche et à droite pour en savoir un petit peu là, un petit peu là, un petit peu là. Alors peut-être simplifier, que ce soit plus simple, plus accessible, ne serait-ce que pour la personne qui vit le handicap là, qu'il(elle) puisse s'informer aussi."

c. "Une préoccupation, c'est de rendre l'information le plus vite possible et le matériel le plus vite possible aussi pour la personne qui a un handicap."

Service Provider Article 5.1.7 **Keeping students informed**

a. "Une fois que l'information est bien établie, il y aurait peut-être un développement à faire au niveau de l'information aux élèves, que ça se fasse par le(la) répondant(e), à savoir l'information que moi j'aurais, il faudrait que je puisse la communiquer par le biais (...) par les rencontres que je fais de la communication à l'élève, pour qu'on puisse clairement établir, que vous essayez d'établir à savoir c'est quoi les vrais besoins des étudiant(e)s, pour les nouvelles technologies. Je pense que c'est peut-être pas encore totalement clair c'est quoi vraiment leurs besoins, c'est quoi qui leur manque. Moi, je ne sais pas là ce qui leur manque, à première vue, j'ai l'impression qu'on répond, mais peut-être si on allait plus en profondeur, on s'apercevrait qu'il y a peut-être des choses qui ne sont pas répondues puisqu'il y a certains manques."

Service Provider Article 5.1.8 **Consulting agency**

a. "I would say, some kind of consultancy. Some kind of consultancy to bring out individual services up to speed. Because we don't always know what's going on in different institutions. We know what's going on in our own institution. I find this forum for starters is a very good one. To get something like that happening so that we all know what the other is doing and we can share information."

Service Provider Article 5.1.9 **Technological developments**

a. "L'autre, il y a d'autres technologies qui nous pointent, j'en ai parlé un peu tout à l'heure, pour le nom de, de la technique je ne la connais pas, mais c'est par rapport aux étudiant(e)s sourd(e)s de lecture labiale; nous on a l'appareil que le professeur porte avec la minicaméra, le nom, je ne le sais pas (...) Alors ça, c'est des technologies que je sais qui existent et j'aimerais bien pouvoir les expérimenter ici, à mon cégep. Donc, pour faire une analyse et pouvoir les exporter dans les régions qu'on a du mal à trouver un interprète oraliste et ben il y a cet, ce matériel-là qui pourrait suppléer. Ça rejoint beaucoup les régions éloignées. Un moment donné, on est, je ne sais pas moi, (à) Sept-Iles ou autre, donc il nous faut un interprète et ce matériel.-là pourrait, même s'il coûte 15 000 $, ça permettrait peut-être de laisser l'étudiant(e) dans sa région et pouvoir continuer à faire ses études. Je l'ai vu fonctionner, ça me paraît quand même un élément qui serait intéressant à, à travailler. Je ne sais pas si vous l'avez vu ou expérimenté? Alors, c'est ça, je me dis, ben si on est un cégep désigné, ça veut dire qu'il faut aussi qu'on soit à l'affût des nouvelles technologies, qu'il puisse les expérimenter pour faire le mieux possible, pour conseiller les autres parce que vous n'avez pas le temps de pouvoir faire ce travail-là."

b. "Les questions qu'on se pose, c'est plus de s'assurer que... quand on insère un appareil, par exemple, un logiciel d'agrandissement dans le réseau, que ça puisse fonctionner avec l'ensemble du réseau."

c. Paraphrase: Un(e) répondant(e) local(e) a fait référence à la possibilité d'offrir des cours en vidéoconférence, à ce sujet, il(elle) présente la situation hypotétique à un certain collège où "il se donne un cours qui est adapté, (par) exemple, un cours de philosophie, pourquoi on ne pourrait pas être (dans un autre cégep) et suivre le cours là-bas, (mais) il n(y)'a (pas toujours) moyen d'aller chercher des financements. (Le besoin) dépend de la situation, des régions problématiques parce que ce n'est pas tout le monde qui veut partir puis qui s'en aller en ville."

d. "Mais là la question, c'est des adaptations spécifiques hein? Ça malheureusement, on a tout à développer parce qu'on n'a rien de ce côté-là."

Service Provider Question (6)

Qu'est-ce qui fonctionne bien dans le domaine des technologies informatiques et des technologies d'information et où voyez-vous les problèmes majeurs pour vous et les étudiants ayant des limitations fonctionnelles dans votre cégep? Quelles solutions envisageriez-vous face aux problèmes mentionnés? Autre(s)

What works really well in the area of computer and information technologies and what do you see as the key problems for you and for students with disabilities at your cegep? What are some possible solutions to the problems that you mentioned? Other(s)

6.1 Service Provider (Article 6.1) Qu'est-ce qui fonctionne bien dans le domaine des technologies informatiques et des technologies d'information? / *What works really well in the area of computer and information technologies?*

Comments: Very few service providers answered this part of the question.

Service Provider Article 6.1.1 **General**

a. "Generally we have most students say, 'Yeah it's been OK.' There's not a lot of major frustrations, and I guess it's the frustration that I was feeling before I came in here, and I feel that I was listening to people. There's probably a lot more out there that we just don't know about or haven't acquired that could be even more helpful if we had it."

Service Provider Article 6.1.2 **The technology works well**

a. "(A) learning disabled student who had the JAWS technology and, you know, a combination of hardware and software that enabled him/her to allow text to be stored efficiently and quickly. I find that really assisted us in our area; it seemed to really work well."
b. "They (computer technologies) seem to be working better and better all the time."
c. "Some of the new technologies, I'm very, very impressed with, especially the software."
d. "Some of this stuff seems to be for the first time working really well, and I think that it has a lot to do with the fact that we're out of DOS now, and we're into graphical interfaces, and we're also using equipment that has tremendously more memory available than previous types of equipment."
e. "Je peux vous dire ce qui fonctionne bien, c'est avoir un ordinateur où les étudiant(e)s peuvent avoir toutes les informations, pour les personnes sourdes, ils(elles) vont pouvoir lire, mais ce que je vous dis là, c'est absolument contraire ou aberrant pour la personne qui a une déficience visuelle, si le support où l'information est véhiculée via l'image pour la personne qui a une déficience visuelle, mais, comme, ma suggestion ne fait pas de sens."

Service Provider Article 6.1.2.1 **Use of technologies available on campus**

a. "There are many, many facilities in the college."
b. "The overall usage of computerization is very, very limited at the college."
c. "We have internet available in the school and it is adapted, you know in terms of tables and things, but they don't spend a lot of time in the school. So they don't do a lot of their homework in the building and a lot of their assignments."

Service Provider Article 6.1.2.2 **Technologies can help**

a. "Moi, mon opinion personnelle, c'est pas la technologie qui avance tellement vite, il faut tenir compte de la technologie, des fois, elles peuvent nous aider."

Service Provider Article 6.1.3 **Technologies are more affordable**

a. Paraphrase: One service provider states: "The price of these systems has come down to such a degree over the past few years because of the decrease in memory costs. So they are now more affordable."

6.2 Service Provider (Article 6.2) Où voyez-vous les problèmes majeurs pour vous et les étudiants ayant des limitations fonctionnelles dans votre cégep? / *What do you see as the key problems for you and for students with disabilities at your cegep?*

Summary: Only a few participants responded to this section, however, problems mentioned earlier were reiterated. Main themes were: lack of money, time, and knowledge regarding what is available and how to use it.

Service Provider Article 6.2.1 **Lack of money, time, and knowledge**

a. "What are the key problems? I think it's issues of time and money."
b. "Alors, je pense, pour moi, que ça serait un éventail de produits informatiques. Je pense pas qu'il n'y a aucun produit qui puisse satisfaire notre clientèle en entier. Les problèmes majeurs pour nous, bien, il y a une question de coûts, j'imagine, ben je dirais (...) oui, une question de coûts et une question aussi de savoir ce qui existe."

c. "I think that we're not asking enough, and so we're not getting enough. And maybe people out there really want their money. But then we have to go back to DGEC and say we had a request for eight laptops and we only own six. We need money to buy more."
d. "I get the impression that, just like me, you wear so many different hats in your job that not much time is available to devote specifically to this function."
e. "I try to do my best at my institution to provide the support services that the students require and, as I mentioned before, I try to adapt also to their needs and not force them to adapt to some structure that I may have established. I think that the smartest thing in providing this kind of help is to be 100% - or almost 100% anyway - flexible, when working with the students."
f. Paraphrase: In regard to having more staff, one service provider outlined a problem. As s/he explains: "It's a thing that's not always that easy to do considering collective agreements and what not. But you know, in an effort to provide, you know, the care that's needed at a minimum, we try to do whatever we can."
g. "You have to research it, you have to acquire it, you have to then become familiar with it, and then teach it to the students - and there doesn't seem to be enough time to do that – and then the money to purchase it."

6.3 Service Provider (Article 6.3) Quelles solutions envisageriez-vous face aux problèmes mentionnés? / *What are some possible solutions to the problems that you mentioned?*

Service Provider Article 6.3.1 **Resources for service providers**

a. Paraphrase: What would be very, very helpful "is if there's a consultancy structure that is built into the system." The respondent elaborates: "with a needs assessment that is clear and pretty much generalized so that I know I'm hitting on all of the possibilities in terms of what technologies are needed. All that the students need, and where their disabilities are, and where they get stuck. Something that is standardized that I would have to be comfortable with in being able to say this is sufficient."
b. "A technician looking it over with me and saying OK, I would recommend this, this, and this in terms of this technology to fulfill his/her needs."
c. "An overall view, to look it over and (say) OK, these are the technologies that we've just isolated, this is what would be reasonable for you to either buy or borrow, and I'll teach you how to use it."
d. "If I had someone taking me through the process like that it would be really wonderful. I think that it would be much more helpful for the students and I would feel like I was in territory that was reasonable in terms of time invested and as well as money invested."
e. "Something that the students can actually use easily and efficiently and that's easy to install, and works well as long as you have a decent point of departure, decent hardware to begin with."
f. Paraphrase: Jokingly, one service provider said in regard to what works well, "I'm hoping that, you know, since we're seeing the federal government starting to download some money to the provinces and healthcare, maybe education will be next. Wouldn't that be nice?"

Service Provider Article 6.3.2 **Assistance for human resources**

a. "Some additional funding coming. Because I think that (is) the only solution to the stress, which is not enough time."
b. "Additional staff, because that is something that I know is so difficult on all our campuses to do. We try to move when we can, to move people around from one area to another, sometimes at peak times during the semester."
c. "I think also the strength in numbers in terms of the consultancy that X had mentioned. That we have this group of clearly identified service providers whatever our computer needs."

Service Provider Article 6.3.3 **Support for centralization of resources**

a. "C'est là où notre affiliation au (parc mobile des appareils pour notre région) est salutaire, parce que, si eux savent pas ce qu'il y a, c'est pas moi, chez-nous, qui va être au courant. Puis, comme eux rayonnent sur un paquet de collèges."

Service Provider Article 6.3.4 **Networking and communication with knowledgeable peers**

a. "Bien, il y a une technologie qui est sur le marché qui est le courrier électronique. (Ce répondant(e) local(e)) puis moi, puis (l'autre répondant(e) local(e)) puis moi, on s'écrit. La raison pour laquelle que je suis ici physiquement là, c'est parce que le contact personne à personne, c'est le plus important."

b. "(...) si vous pouviez avoir comme une nouvelle technologie d'information qui pourrait être vidéo, ce que vous avez préparé, si vous pouviez le préparer ou le présenter de façon synthétique, mais vidéo, pour que les gens voient à l'écran comme s'il y a une caméra, vous puissiez montrer ce que vous venez de nous dire. Les gens ne l'auront pas uniquement par écrit, ils l'auraient pas par courrier électronique, ils l'auraient d'une façon la plus proche de personnel. C'est-à-dire, qu'il y aurait la combinaison et du visuel et de l'auditif, puis vous pourriez mettre même les caractères là, décodables, pour tout le monde, puis vous rejoindriez la clientèle."

Service Provider Article 6.3.5 **Context of service provision in cegeps**

Service Provider Article 6.3.5.1 **The student population varies from year-to-year**

a. "Parce que là, j'ai deux cas cette année, mais qui sait si je vais en avoir d'autres là, c'est un petit campus, dans une petite ville, ça se peut qu'on en ait d'autres."

b. "C'est aussi très aléatoire, parce que, tu vois, moi, cette année, j'ai sept personnes handicapées, ça se peut que l'année prochaine, j'en aie juste un. Ça se peut que j'en aie pas. Fait qu'on est toujours comme à la remorque de notre clientèle."

c. "Je ne sais pas parce que je ne sais pas quel type de clientèle je vais avoir et je ne sais pas si je vais avoir encore une clientèle. Quand moi j'ai pris le dossier, il y avait une personne handicapée, il(elle) avait besoin d'aucun service."

Service Provider Article 6.3.5.2 **Service providers multi-task**

a. Multiplicité des tâches du(de la) répondant(e) local(e): "Ce n'est pas notre dossier principal aussi. Parce que c'est un dossier qui est venu par-dessus les autres puis, avec les années, on dépile pas, on (empile)."

b. Services généraux offerts par répondant(e)s locaux(ales): "Prêter un local, adapter un protège-frappe. C'est tout. Il y avait un(e) prof accompagnateur(trice) à ce moment-là en disponibilité qui est accompagnateur(trice) pour ces deux étudiant(e)s-là."

c. Services liés à l'informatique: "A lot of our students who have learning disabilities, particularly newly diagnosed, are still pretty overwhelmed with stuff like the technology. What we (DSS) try and encourage them to do is to start using it, acknowledging the fact that it's a slow learning curve sometimes, and there's a lot of frustration."

d. Summary: Les répondant(e)s locaux(ales) agissent en tant que personne-ressource
- "Nous autres, on est la cour à transmission parce que nous savons à quelle porte aller frapper. OK, c'est dans ce sens-là."
- "(Quand) l'étudiant(e) arrive avec un problème informatique, si je ne connais pas l'appareil, je vais le(la) référer (entre autres) au (à la) technicien(ienne)."
- "Je te dirais que j'ai un rôle comme répondant(e) de les sensibiliser à ce qu'il peut se faire, et bien souvent l'élève n'est pas au courant de toutes les possibilités technologiques qui sont offertes à lui(elle), et l'élève, une fois qu'il(elle) est sensibilisé(e), il(elle) est peut-être plus en mesure de faire des essais avec les technologies. Je promeus l'utilisation de ces appareils-là comme étant un moyen technique pour apprendre."
- "I mean, how many students were sent to me by teachers who want a pre-assessment for LD? And I'll refer (them) to the Learning Associates."
- "I'll find out a little bit about what's out there, but I won't use it right away. But somebody will need it, and then I'll get it, and then I'll learn how to use it, because I need it right now."

Service Provider Article 6.3.5.3 **Services are, spur-of-the-moment and individualized**

a. "On répond aux urgences. C'est à peu près ça là. C'est plate à dire là, mais c'est notre réalité, en tout cas, la mienne comme répondant(e)."

b. "Je t'avoue que, pour des cas avec qui j'ai dû travailler, ça ne prend pas vraiment de bagage pour faire une composition, pour avoir une réaction au fond. On a eu quelques besoins, on les a réglés, ç'a fonctionné, l'étudiant(e) a opéré(e), ç'a réussi pour lui(elle) (...) Peut-être que si j'avais eu plus de cas que ça, je pourrais dire (...) je ne sais pas, peut-être le(la) (répondant(e) local(e) central(e)) est en mesure de dire: 'Ben, oui! Il y a des domaines où on n'a (...)' Parce que nous autres on n'a pas une vision globale du réseau, on a notre petit collège avec un(e) ou deux handicapé(e)s qu'on connaît très bien, on peut leur répondre (...)"

c. "But definitely, although we have our own room, we also want to make sure that students are set up in the labs."

d. "The needs are very varied, and I feel that I go by crisis orientation rather than by prevention and education."

Service Provider Article 6.3.5.4 **First contact and evaluating the student's needs**

a. "Moi, ce que ce que je trouve intéressant dans un premier pallier, c'est que, généralement, l'étudiant(e) nous arrive du secondaire. Et moi, ce que je fais toujours quand j'ai un dossier qui m'arrive, c'est que je prends contact avec la commission scolaire et je prends contact avec ces centres-là : j'ai reçu tout un beau protocole du(de la) responsable audiovisuel de la commission scolaire qui m'expliquait comment le système FM fonctionnait (...) l'étudiant(e) est arrivé(e) avec et on a eu qu'à le vivre, finalement, mettre les profs au courant, bon (...) et ça, je trouve ça précieux parce que là, on, on prépare le terrain. L'étudiant(e) ne se retrouve pas devant rien, on n'est pas à la dernière minute, il(elle) ne commence pas ses cours en retard, les appareils ne sont pas là."

b. "C'est important de vraiment entrer en contact avec la personne, pour lui donner des services."

c. "Donc en début de session, effectivement, je suis disponible, pour la phase d'apprentissage, après ça ils(elles) sont autonomes, le plus possible là."

Service Provider Article 6.3.5.5 **Preventative measures**

a. "Il existe un plan d'intervention dans un guide, toutes (les) questions sont prévisibles et peuvent être structurées. C'est sûr que (...) bon, s'il y a une décision à partir, l'étudiant(e) arrive au 26 juillet, puis il(elle) décide qu'il(elle) s'en vient, on va courir, puis on va avoir des problèmes. Mais, de façon générale, on est informé(s) en mai au plus tard qu'on aura un élève qui a des besoins."

Summary: Toutefois certain(e)s répondant(e)s semblent s'opposer à cette méthode prédéterminée.

b. "I try to adapt also to their needs and not force them to adapt to some structure that I may have established. I think that the smartest thing in providing this kind of help is to be 100% - or almost 100% anyway - flexible, when working with the students."

c. Paraphrase: Au sujet de la question Q4, un(e) répondant(e)(e) local(e) dit "Moi je trouve que c'est difficile à répondre à ça parce que ce qui est avantageux pour un est désavantageux pour l'autre."

Service Provider Article 6.3.5.6 **Assistance from others in the cegeps**

a. In office for students with disabilities: "With respect to purchasing, (service provider from same institution) has been very helpful to me over the years. One of the people that works in our office, s/he has a computer for placement testing and s/he allows students to print something."

Service Provider Article 6.3.6.7 **Other personnel in the cegeps**

a. "Quoique là, je m'avance sur un terrain complètement inconnu là. Puis, puisque le nombre de personnes a comme un peu explosé, il y a beaucoup plus d'enseignant(e)s qui sont au courant. Peut-être comme une cinquantaine d'enseignant(e)s par session qui reçoivent de l'information comme quoi il va y avoir une personne avec certaines caractéristiques qui vont entrer dans leur cours."

b. "Puis là, il y a une réaction au collège, mais encore là, c'est au niveau du corps professoral. Au niveau de la direction, ça semble avoir peu d'impact, donc comme c'est les décideurs, il y a pas de déroulement au niveau de l'action des prise de décisions puis ces choses- là."

c. "At my institution we don't have a Learning Centre like that - there's peer tutoring, there's uncommonly long hours for teachers, the English teachers who have a very rough time in dealing with (...) you know, 30% of our population is allophone, and another 30% is francophone. So these (...) You know there's not a large base really."

Service Provider Article 6.3.6.8 **Computer services in the cegeps**

a. "Ça fait partie des services du collège, comme un laboratoire informatique aux étudiant(e)s, le(la) technicien(ienne) est là pour dépanner."

Service Provider Article 6.3.6.9 **Advantages of centralization of information**

a. Le soutien (du parc mobile des appareils) semble être apprécié: "Qu'est-ce qui fonctionne bien? Si quelqu'un entend parler de quoi, ils peuvent le véhiculer ici, puis le réseautage est mieux comme ça que si on est isolé, puis on est isolé dans d'autres domaines, moi, c'est pas mon seul dossier, je possède, dans d'autres domaines, on a pas de communication comme ça, parce que c'est le seul dossier ici, c'est bien agréable d'avoir ce support-là."

Service Provider Article 6.3.6.10 **Availability of suppliers and equipment**

a. Used in school
   - "We're seeing a lot less of the suppliers. I remember one time they would just rattle off and come with their equipment and now we're just not seeing as many of them, I don't know either we're just not buying as much equipment, or if their sales areas become broader. Some of them moved to Toronto. Don't see as much of them."
   - "C'est la même affaire pour (cet(cette) étudiant(e)) qui est malentendant(e), puis il(elle) aussi a eu(e) des appareils de son organisme qui ont été fournis."

b. Used at home
   - "(Students are) pretty well equipped at home, and they use the internet for a large part of their socialization."
   - "Most of our students do have some kind of technology at home."
   - "C'est, chez-lui(elle), à sa maison là qu'il(elle) utilise cet ordinateur-là. Donc, c'est pour faire ses travaux et tout ça."
   - "We do have some students who have their own systems; I have a learning-disabled student who uses JAWS. S/he's got his/her own laptop, s/he carries it around, s/he's got his/her own CD burner s/he's able to download text onto a CD transcript of his/her own laptop computer, and s/he's got it on a system which reads it to him/her just as a scribe would do."
   - "The heaviest users of computer technology are students who are visually impaired or blind (...) The government (is) giving them the same kind of equipment at home that we favor here, and how to coordinate."
   - "We've seen that a few of them have moved into internet usage, but from what I can gather they make very little use of the internet services at the College. Those who have it make use of it at home for the most part."

Comments: Service providers are aware of the existence of newer and better technologies that could be helpful to students. However, the primary barrier tends to be financial. These two factors, awareness of newer and better technologies and lack of finances, were mainly mentioned by anglophone service providers.

Service Provider Article 6.3.6.11 **Problems encountered by service providers**

Comments: Outre la variation du nombre d'étudiant(e)s, les répondant(e)s locaux(ales) ont rencontré(e)s les problèmes suivants.

a. Manque d'espace pour les technologies
  - "Chez-nous, c'est l'espace qui manque."
  - "A big problem (is that) our MIS department (Management Information Systems) is over-extended as it is. The school is full of computers, so when we put in a service call, it takes these guys a week to get to us. So meanwhile your equipment is not being used."
  - Paraphrase: Service providers identified two major problems. The first is lack of time. The second problem occurs in the smaller colleges where there are too few students, and service providers are not aware of different criteria for different groups. Thus, a coordinated effort is needed to keep service providers informed of what is actually available and of the changes to these programs.

b. Manque de temps alloué à l'apprentissage et manque de connaissances
  - "One thing we're lacking is time. That (there) really isn't a down period in our service where you just take off for a few days and play around with the equipment."
  - "For me, I find that my biggest problem is if the interest is there right now for computer technologies, I don't have a lot of time where I'm really using it for myself."
  - "I think that there's room for improvement at my institution for computer services, and it certainly doesn't help that I don't have a big background in it."
  - "On n'est pas des spécialistes en la matière."

c. Manque de contact pour l'échange d'information
  - "The other thing I think that we're lacking is that maybe because of our geographic area and our linguistic boundaries that we don't have a lot of contact, except with (other service providers in our region)."

Service Provider Article 6.3.5.12 **Identification of disabilities**

Summary: Primarily in the English systems, service providers spoke a great deal about the problem of identification of disabilities. Learning disabilities are a primary concern. With regard to learning disabilities, concerns tended to focus in two areas: identification of learning disabilities and students who had not mastered the English language.

a. Paraphrase: "There's 40% of students who've actually gone through the English system (...)" Although some of these are English speaking, the service provider wonders if students were properly identified and if so, "has anyone ever actually worked with them and really looked at where their weaknesses are and where it comes from?"

b. "If there was a diagnostics system and an evaluation system, especially for the numbers, it would be more obvious."

c. Another provider spoke of specific academic-related problems: "They can't rely on their memory any longer, they don't have the tools, they - some of them - do not have the abilities. They have real discrepancies in their learning. But, they were quick enough that they knew they could rely on their memory, and now they can't do that any longer. So some of them do get diagnosed pretty late. I've been getting quite a few students, giving some business to the Learning Associates."

d. Paraphrase: In terms of identifying students, service providers have to take into account two considerations: getting a proper diagnosis (to provide appropriate services) and accruing a critical number of students (to obtain funding). In terms of identifying students with disabilities, "I guess students will identify based on what's in it for them. And I think that's why we're trying to get numbers."

e. "Those who have come to adapt to their disability are the majority. We end up seeing those who have very real needs and who come forward."

f. "It's to their advantage to say, 'I have a learning disability'. And then I feel that it's certainly appropriate advantage, because certain courses are better suited to them. They have to work harder, so let's give them courses that they're motivated in. Some teachers are better able to adapt. But a lot of the disabled students said I didn't think it was me. Until they need something."

g. "Sometimes (I) get concerned about the kinds of students we're servicing. I don't think we're servicing necessarily the students who have the greatest difficulty learning in class with different learning disabilities. I think we're servicing the middle-class student who's had family support who have gone through, uh, are going through assessment and paying for it, pushing for it, etc. I'm thinking of all the kids that we're not helping, because it was never picked up, and I when I do this here for the first time, I saw a student who you know got all the help in high school but there wasn't a piece of paper to support it."

h. "(...) In terms of medical problems or chronic physical issues. Because how many kids, again the need is not there, they can get around the building, but it's when they get to the phys. ed. class and find out that they're waiting for a heart transplant. You know, and they're a little nervous of the phys. ed. and the teachers (...) it's the only time at my institution that we have considered that maybe an exemption might be a good idea. But the phys. ed. department would be another source of information for who's out there."

i. Paraphrase: Another service provider finds problems within the education system: "But, I see that as a major lack in the education system that, you know, that some very good people that have a lot of motivation have never been adequately diagnosed. So there's no re-mediation that's been given to them. And then they get to the cegep system, and some of them make it and some of them don't."

j. "(...) If everyone spent lots of time and energy in just doing their research, would there be any way of tracking coded students with learning disabilities from high school that were then admitted into cegep. That would give us some idea. At least another set of figures to work with."

k. Paraphrase: Les répondant(e)s offrent des services autant à des étudiant(e)s qui ont un handicap reconnu que ceux(celles) non reconnus par le gouvernement: "Pour te donner une idée, moi, j'ai X élèves qui sont reconnus(...) ici, comme (ayant) une déficience fonctionnelle majeure. Par contre, moi, dans ma liste, j'en ai Y que je m'occupe. Fait que j'en ai Z qui ne sont pas reconnus, mais pour lesquels je donne des services."

Service Provider Article 6.5.3.13 **Suggested Solutions**

a. Paraphrase: Solution to lack of knowledge, cost and time: "One of us went to a conference in California you know, six or seven years ago, and it's not going to happen again for quite a while. So the biggest focus is more for maybe people coming here."

b. Paraphrase: Au sujet de manque d'information. "(...) si je disais ça (au (à la) responsable central(e)), (il(elle)) dirait peut-être: 'Lis dont nos documents!' Il y aurait peut-être certains documents qu'il faudrait que je lise plus."

c. "Nous, on devrait avoir une formation."

d. "Les gens qui produisent les technologies nous montreraient comment les utiliser."

e. "Tout ça pour vous dire que dans les solutions aux problèmes mentionnés, si vous pouviez avoir comme une nouvelle technologie d'information qui pourrait être vidéo, ce que vous avez préparé, si vous pouviez le préparer ou le présenter de façon synthétique, mais vidéo, pour que les gens voient à l'écran comme s'il y a une caméra, vous puissiez montrer ce que vous venez de nous dire. Les gens ne l'auraient pas uniquement par écrit, ils l'auraient pas par courrier électronique, ils l'auraient d'une façon la plus proche de personnel. C'est-à-dire, qu'il y aurait la combinaison et du visuel et de l'auditif, puis vous pourriez mettre même les caractères là, décodables, pour tout le monde, puis vous rejoindriez la clientèle."

Service Provider Article 6.3.5.14 **Wish lists for technologies**

a. Technology: Paraphrase: Different service providers wished for "Technology that is easy for the student to use," "I'm hoping (…) that eventually in all of those labs there will be at least one unit that'll have ZoomText or some version of that," "I'm also looking hard for some kind of scanner."

b. Services: "Learning Centers where students go and get more help for them (...) I think the specialists would be very good, crucial people really, to see how many of the problems are two or three magnitudes in the background. It's not obvious until you really start working one-on-one with (students) over an extended period of time and see how they deal with information and what improves and what doesn't improve."

Service Provider Article 6.3.5.15 **Future requests**

a. "Moi, quand j'en ai eu besoin, ce qu'on va avoir de besoin l'année prochaine, c'est un prêt, pour (…) c'est un logiciel qu'on va mettre dans les ordinateurs du collège. Puis en principe je crois que l'élève m'a dit qu'il(elle) l'avait, lui(elle) aussi, à la maison."

Professor Focus Group Data Summary

Similarly to students and service providers, not all professors answered aspects of a given question. In total, 7 English professors, 4 men and 3 women, participated in this focus group. French professors were interviewed individually after the French-speaking focus group in Montréal was cancelled.

Professor Question (1)

Utilisez-vous des ordinateurs ou des technologies d'information dans vos cours? Si oui, s'il vous plaît décrivez la situation. Par exemple quel logiciel (software) ou équipement matériel (hardware) utilisez-vous? Où et comment en faites-vous usage (c.-à-d. pour faire des devoirs à la maison, lors d'activités en classe)? Utilisez-vous l'internet? Si tel est le cas, quel usage en faites-vous? Sinon, prévoyez-vous l'utiliser dans un proche futur? Si tel est le cas, lesquelles croyez-vous utiliser vous-même?

Do you have a computer or internet component included in any of your courses? If yes, please describe [e.g., What software/hardware do you use? Where and how do you use these (i.e., homework assignment, in-class activities)? Do you use the internet? If so, for what purpose?]. If no, do you foresee this in the near future? If so, what do you see yourself using?

1.1 Professor (Article 1.1) Utilisez-vous des ordinateurs ou des technologies d'information dans vos cours? / *Do you have a computer or internet component included in any of your courses?*

Summary: 4 of the 7 English professors used computers in their courses. Two professors, both teaching social science courses, did not. Only one did not respond directly, and made general comments about the department's use of computers instead. All the francophone professors seem to incorporate computers into their courses, many added that they did so on a daily basis: "tous les jours", "tout le temps" , "c'est comme assez intégré là, mais c'est notre domaine". With the exception of one professor who indicated that despite being a computer user, "dans la partie théorique, moi comme tel, je n'utilise pas l'ordinateur, c'est plus théorique, c'est plus le tableau. Des fois, ça peut arriver qu'on utilise, ce qu'on appelle des acétates électroniques là."

1.2 Professor (Article 1.2) Si oui, décrivez la situation. Par exemple, quel logiciel (software) ou équipement matériel (hardware) utilisez-vous? / *If yes, please describe (e.g., What software/hardware do you use?).*

Professor Article 1.2.1 **Software and hardware**

a. "In three mainstream courses. We use simulation-type programs on the Mac. For example, we have a fruit fly simulation where they breed in nanoseconds. We have X computers."

b. "Students work in pairs or trios. We also do molecular imaging, which is all done in the lab. There's no facility elsewhere."

c. "An internet component. It is used to its fullest. We use Java Script, Real Presenter, PowerPoint, and Publisher (all with Real Audio and Real Video). We also have ASP (Active Server Pages) that is great for forms. I use a Pentium 133 with a terminal server."

d. "Some lectures are presented from the net (Netscape). Students can get information from home: 'GroupWare' where we sample questions for assignments and promote discussions. The labs are computerized."

e. "We use 'All Right' software, Word, Adobe Pagemail, and I would like to use Acrobat for presentations."

f. "I have an internet component in class. I make all of my notes available before class."

g. "Ce qu'on utilise, à l'intérieur des cours c'est des logiciels, comme exemple, dans mon cours de méthode quantitative, c'est surtout le logiciel Excel avec lequel on amène les étudiant(e)s à travailler sur le chiffrier pour atteindre les objectifs du cours."

h. "Dans le cours Initiation pratique à la méthode de recherche, les étudiant(e)s sont appelé(e)s là aussi à travailler sur un logiciel qui s'appelle Sphinx. Sphinx, c'est un logiciel qui aide les étudiant(e)s à préparer leur questionnaire et qui traite aussi les données que les étudiant(e)s ont recueillies pour leur recherche. Ensuite de ça, les étudiant(e)s sont appelé(e)s à la mettre sur traitement de texte, ils(elles) doivent déposer leur document sur traitement de texte, et le logiciel Sphinx même fait le lien aussi avec le logiciel Excel."

i. "J'ai fonctionné(e) avec le matériel que j'avais, fait que, dans les ordinateurs où on (avait) le générateur de pages Web qu'on avait, c'était la fonctionnalité dans Word, il y a la fonctionnalité (pour) transformer en HTML."

j. "J'avais accès à une version de Publisher."

k. "J'ai quelques étudiant(e)s qui ont exploré(e)s le logiciel de dessins Pine, parce que c'était le seul qui était dans les appareils, étant donné que nos laboratoires sont pas dans les plus up to date et on doit faire des miracles avec ce qu'on a."

l. Paraphrase: Certain(e)s utiliseront "des logiciels déjà conçus, déjà faits, que ça soit des logiciels de chiffriers, de bases de données ou des logiciels de dessins", "des logiciels aussi de conception, conception assistée par ordinateur", "des acétates électroniques", "des traitements de texte" , "les banques d'informations qui sont disponibles sur cédérom, comme: 'Mass Fulltext ou Actualité Québec', 'Power Point'."

Professor Article 1.2.2 **Specialized software**

a. "Un logiciel qui a été fait pour l'enseignement de ce cours-là, c'était surtout sur du Cad, et il y avait aussi des logiciels de calcul, d'hydraulique et autres", "Les logiciels qui sont utilisés sont les compilateurs en C, en langage C, plus précisément Quick C"

b. "On a des logiciels spécialisés. Donc ce qu'on utilise c'est un logiciel qu'on appelle Rééduque qui est un logiciel qui a été créé pour les personnes, des enfants, des jeunes et des adultes qui ont des problèmes cognitifs. C'est utilisé dans certains des centres d'accueil et des milieux où nos étudiant(e)s sont appelé(e)s à travailler. Je n'ai pas les coordonnées exactes de ce logiciel-là, mais c'est un logiciel de pratique cognitive (...) genre activités de discrimination, de reconnaissance de lettres, de formes, de mémoire, reconnaissance de sons. C'est un gestionnaire d'utilisateur qui permet de générer aussi des rapports. Je leur fais utiliser aussi des logiciels éducatifs, Adibout."

Professor Article 1.2.3 **Program and teaching methods**

a. "Our teaching is very traditional. We are aware that we could use them more, we're just starting to figure them out. However, some good interactive simulation software is being developed."

Professor Article 1.2.4 **Reasons for not using computers**

a. "I don't think teachers will get online. I've used the Net, but eight out of thirty students had no access. Of the twenty-two who did have access, they didn't own a computer or didn't know how to use the Net. Computers should be used as a supplemental tool (not as a primary tool)."

b. "No, there is no computer component in our classes. Most of the faculty are just starting to use computers or the Net."

c. "On n'a pas de bons appareils pour ça (...) L'acétate électronique qu'on a, c'est du type à cristaux liquides, ce n'est pas un projecteur à multimédia là."

d. "C'est surtout ça, dans d'autres, c'est-à-dire, en génie civil, ils utilisent Landschool, qui est un logiciel qui gèle les écrans des étudiant(e)s quand tu leur fais une démonstration, puis, c'est-à-dire, de forcer le défilement de certains écrans. Mais nous on n'utilise pas ça. Au collège, il y a certaines personnes qui utilisent Landschool, mais pas nous. Pas notre département."

e. "Mais on n'a pas, dans le cégep, on a un acétate électronique, on n'a pas de canon quand on veut faire des projections multimédia. Le système n'est pas multimédia, ce que je veux dire, c'est qu'on n'a pas de son (...)"

f. "Une autre chose, une autre chose qui est intéressante et qu'il faut que je reconnaisse à mon cégep (et) qu'ils ont fait, l'été passé: les bureaux de tous les professeurs ont été connectés, branchés au réseau, ce qui fait que moi, de mon bureau, si j'ai un ordinateur, parce qu'il me faut un ordinateur, avec mon ordinateur, je peux me brancher sur le réseau et faire des recherches directement de mon bureau ou déposer des fichiers sur le serveur de mon cégep, parce que (...) pour avoir droit à un espace disque sur le serveur, il faut faire une demande, on ne l'a pas automatique. Moi, étant donné que, (ce cours en particulier), j'ai fait une demande l'année passée et j'ai eu un espace disque, et je peux déposer directement sur le réseau du cégep des documents. Fait que dans mon département, je dirais, je fais le tour, on est dix professeurs et il y a neuf professeurs qui utilisent l'informatique."

Professor Article 1.2.5 **Other technologies**

a. "Un rétroprojecteur à l'occasion avec des acétates", "magnétoscope", "On se sert également des simulations vidéos, vidéos-feedback".

1.3 Professor (Article 1.3) Où et comment en faites-vous usage (c.-à-.d. pour faire des devoirs à la maison, lors d'activités en classe)? / *Where and how do you use these (i.e., homework assignment, in-class activities)?*

Professor Article 1.3.1 **Integrating computers in courses**

a. "J'utilise les nouvelles technologies à l'intérieur de (certains de mes) cours. Les étudiant(e)s vont dans un lab pour eux(elles) et ils(elles) y vont au moins à cinq reprises durant la session. Ils(elles) sont dans deux laboratoires. Un qui était pour internet qui est un laboratoire Macintosh qui comprend vingt appareils là tout à fait récents, et un autre qui comprend autour de seize, dix-sept appareils aussi Macintosh assez récents également qui est destiné, lui, plus à l'enseignement."

b. "C'est beaucoup autour des ordinateurs, les applications des ordinateurs et les réseaux d'ordinateurs. C'est-à-dire, le raccordement des ordinateurs en réseau et leurs interactions, c'est clair que ça fait (...) ça fait comme partie d'à peu près tous les cours qu'on donne. Il y a des ordinateurs dedans, il faut qu'on, qu'on montre comment les ordinateurs fonctionnent puis comment on s'en sert. C'est très clair, on va à tous les niveaux : au niveau matériel, au niveau hardware électronique, puis on va aussi au niveau logiciel. Les étudiant(e)s ont à connaître les notions de base de programmation, ils(elles) ont à programmer. C'est sûr, qu'ils(elles) utilisent beaucoup de logiciels, et aussi, ils(elles) en créent des logiciels. Et aussi au niveau des technologies d'information, internet, ça fait partie intégrante de l'apprentissage."

c. "C'est pas toujours obligatoire, mais dans certains cas, je donne un (certain) cours et leur rapport, ils doivent obligatoirement être produit par traitement de texte. Puis là, ils(elles) peuvent utiliser les logiciels de traitements de texte qu'on a dans nos laboratoires."
d. "Les étudiant(e)s doivent consulter à la bibliothèque. Alors, par un travail qui consiste à découvrir ces outils, alors, ils(elles) ont un guide qui les fait passer à travers les différentes étapes, les différentes pages écrans (...) alors ils(elles) peuvent comme ça découvrir l'outil (en bibliothèque). Et plus tard, en session, ils(elles) ont un travail de session qui fait appel à ces outils-là. Alors une fois qu'ils(elles) les ont découverts par un premier exercice qui est un exercice de familiarisation, donc dans un deuxième, ils(elles) ont à s'en servir pour trouver de l'information pertinente pour le travail qu'ils(elles) ont à faire. Alors, j'utilise également, dans un même cours, j'ai une banque de transparents qui ont été faits avec des outils comme ça (internet, base des données) et puis avec Power Point. Alors je suis en mesure de présenter des acétates en utilisant des transparents, en utilisant cet appareil. Également, je me sers de cet appareil-là en le couplant avec un magnétoscope pour présenter des vidéos."
e. Paraphrase: Le professeur nous informe qu'avec un(e) étudiant(e) ayant un handicap auditif: "Mais lui(elle), il(elle) utilisait ça, justement, ç'a été notre moyen de communication. Mais dans d'autres cours, je les utilise, mais pas ce cours particulier là."
f. "Moi, c'était beaucoup pour la mise en plan, dessins de plan."
g. "Oui, c'est des activités et en classe et des devoirs, et des fois aussi pour passer de la théorie parce que nous avons un logiciel qui permet de projeter dans l'écran des étudiant(e)s ce que je vois sur mon écran (...)"
h. "L'étudiant(e) a à compléter, à écrire des programmes chez-lui(elle) à la maison, pour les laboratoires, et à partir de ce qu'il(elle) a écrit, il(elle) a à faire les montages appropriés en laboratoire, et puis à partir de ça, il(elle) a à vérifier la fonctionnalité de son programme et puis, il(elle) a à intervenir, c'est-à-dire, s'il y a des erreurs dans son programme, bon ben, c'est un processus d'apprentissage dans lequel il(elle) recompile le programme, il(elle) essaie de nouvelles instructions pour régler les problèmes qu'il y a."
i. "Oui. Mais c'est-à-dire, ça, c'est la partie laboratoire, il y a, ils(elles) sont, moi c'est un cours, trois heures de théorie, quatre heures de laboratoire, qui, ils(elles) passent quatre heures en laboratoire, puis ils(elles) ont trois heures de théorie qui est en classe, mais là c'est un cours qui est plus magistral où on utilise le tableau, des acétates, des choses comme ça. En laboratoire, quand je fais des démonstrations, c'est que les étudiant(e)s, habituellement, je vais le faire en deux groupes ou des choses comme ça. Les étudiant(e)s, ils(elles) viennent autour du poste et puis je fais la, la démonstration on line, si on peut dire. Et puis la plupart du temps aussi, souvent, on va mettre sur le réseau un fichier exécutable de ce qu'ils(elles) ont à faire, fait qu'ils(elles) sont capables de voir qu'est-ce que ça va donner, qu'est-ce qu'ils(elles) ont à faire, ils(elles) ont un exemple de, de fichier exécutable, alors: 'il faut exécuter, ah, c'est ça qu'il veut, ça c'est comme ça, c'est comme ça.' Eux, ils(elles) ont toujours accès à ce fichier-là pour savoir un peu le produit fini qu'ils(elles) doivent produire."
j. "Ils(elles) ont à faire certains jeux et après à faire un rapport et à identifier quelles composantes psychomotrices ces activités-là permettent de travailler chez l'enfant."
k. "C'est certain que pour la préparation des cours pour cette année j'ai envoyé des notes de cours, des consignes par courrier électronique."
l. "Ce qui fait que cette année, exemple, pour les présentations des étudiant(e)s, il y avait des étudiant(e)s qui ont utilisé Power Point, parce que moi, je les encourageais, je leur avais fourni un canevas de présentation, parce que moi j'avais monté, ils(elles) avaient juste à remplir, avec les éléments spécifiques et il y a deux, il y a deux groupes qui les ont utilisés, mais on a dû les projeter, les étudiant(e)s les ont visualisés à l'écran finalement, on l'a mis sur le réseau parce que le laboratoire est en réseau et les étudiant(e)s l'ont consulté à l'écran comme une présentation."

Professor Article 1.3.2 **Use of computers in departments**

a. "Computers are institutionalized in all biology courses."
b. "My program has targeted computer skills. Research methods and term papers in second level courses are required to be typed; it makes it easier to read. More textbooks are coming out with

Net access or CD-ROM. Technology is being used more and students don't need access at home because (our cegep) has computer labs."

c. "(There are) seventy English teachers at (our college) and about three use the computer labs. In B-block courses, we can use labs to have students write. In 101 courses we can do grammar and structure exercises. There aren't a lot of teachers keen on using computer labs."

Professor Article 1.3.3 **Limitations of computers in teaching**

a. "Des fois on ne trouve pas que c'est nécessairement une bonne stratégie pédagogique, il ne faut pas que ça dure trop trop longtemps parce que c'est difficile de garder (les étudiant(e)s) sur ça. C'est préférable quand les étudiant(e)s eux(elles)-mêmes manipulent ça. C'est-à-dire eux(elles)-mêmes devant, par exemple, un logiciel, ils(elles) sont dans un laboratoire, ils(elles) font l'apprentissage par eux(elles)-mêmes. Que moi je fasse une démonstration, bof, j'essaie d'éviter ça. C'est pas efficace, je trouve, comme utilisation du temps là. En tout cas, dans certains cas ça pourrait être intéressant. Il y a certains professeurs qui les utilisent, mais il y a toutes sortes de problèmes techniques reliés à ça. Il faut, que ça soit assez lumineux, il ne faut pas qu'on ferme trop les lumières dans la classe parce qu'ils ne voient plus rien à l'écran. Comme, puis des fois, ils ont tendance à s'endormir quand il fait noir, fait qu'on essaie d'éviter ça."

b. "Là comme c'est là, c'est assez difficile, c'est assez pénible. Dans les laboratoires, chaque élève travaille avec son ordinateur (...) Puis on fait de l'intervention individuelle."

c. "Puis j'utilise plus spécifiquement, les ordinateurs dans le cours d'initiation pratique à la méthodologie des sciences humaines, on utilise, nous, un logiciel qui s'appelle Sphinx, qui est un logiciel qui permet aux étudiant(e)s de construire un questionnaire d'enquête, d'entrées des données, puis de compiler des données, et de faire l'analyse préliminaire, présenter même des tableaux de, des résultats de leur enquête. C'est (...) en gros c'est ça."

Professor Article 1.3.4 **Access to computers**

a. "On a spécifiquement réservé aux étudiant(e)s en sciences humaines (certains) laboratoires (...) d'informatique d'une vingtaine d'appareils dans chacun, dix-huit à vingt appareils chacun. Puis les deux sont branchés aussi sur l'internet. Un qui sert, qui est exclusif aux étudiant(e)s de sciences humaines. Donc on s'en sert plus pour la recherche, la recherche dans ce sens-là. L'autre, c'est des laboratoires qui est dans nos locaux de classes qui servent plus pour les cours de méthodologie de recherche et méthode quantitative, qui peuvent servir pour faire de l'internet."

b. "Ben, je demande, quand j'ai ces cours-là d'avoir cette classe-là pour mon enseignement, donc j'ai une classe où j'ai un ordinateur par étudiant(e). Et les étudiant(e)s peuvent y retourner faire leur devoir à la condition qu'il n'y ait pas de cours dedans."

c. "En dehors des heures de cours, ils(elles) ont accès aux laboratoires, il y a un laboratoire qui est ouvert, s'il est disponible dans le jour, ils(elles) peuvent y aller, mais il peut y avoir certains cours, habituellement, il est assez plein, mais le soir jusqu'à 10 h, ils(elles) peuvent avoir accès à ce laboratoire-là. Habituellement, la plupart des professeurs, on accepté de remplir tout le laboratoire, même si ce n'est pas nécessairement tous des étudiant(e)s de notre groupe. Fait qu'ils(elles) ont relativement accès aux ordinateurs. Mais en général, ils(elles) pourraient compléter leur travail ici à l'école. Donc, étant donné que les laboratoires sont en réseau, ils(elles) ont toujours accès ce compilateur-là."

d. "J'étais dans un laboratoire qui était aussi utilisé par des étudiant(e)s en administration, ce qui fait qu'une grande partie de la mémoire de disque dur qui était utilisée pour des logiciels spécialisés pour l'administration. J'ai accès au laboratoire trois heures/semaine, et j'ai accès à un local classe trois heures semaine."

1.4 Professor (Article 1.4) Utilisez-vous l'internet? / *Do you use the internet?*

Professor Article 1.4.1 **E-mail and internet**

a. "I amplify and answer questions on the notes in class. It's effective and enhances the social environment. Students are more willing to ask questions. Students send me e-mail. This opens up dialogue. It helps the student-teacher connection."

b. "Chaque étudiant(e), au début de la session, je leur ai fait prendre un courrier électronique gratuit."

c. "Les étudiant(e)s, on les oblige également de faire une partie de leur recherche sur internet. Habituellement les étudiant(e)s, on les initie, surtout à Netscape Communicator qui est le logiciel qu'on utilise, mais ils(elles) sont libres, s'ils(elles) sont habitué(e)s avec Explorer, parce qu'il y en a quand même pas mal qui ont déjà des habitudes de travailler sur internet chez-eux(elles). Et là aussi on a un lab qui est destiné à la recherche sur l'internet."

d. "(E-mail) improves communication. For example, with e-mail. I will be able to answer students' questions."

Professor Article 1.4.2 **Use of on-line databases**

Summary: Different teachers named the following databases: E-Stat, Justice Canada, Gouvernement du Québec

1.5 Professor (Article 1.5) Si tel est le cas, quel usage en faites-vous? / *If so, for what purpose?*

a. "Donc on les utilise puis (...) puis à l'intérieur des cours, c'est un outil très approprié, internet, parce que ça nous permet, de faire des recherches sur des sites assez reliés sur ces questions-là."

b. "Par exemple, si on a besoin de composantes électroniques particulières, on travaille de moins en moins avec ce qu'on appelle des Data Book ou des catalogues d'information; notre information, ils(elles) vont immédiatement la chercher sur internet. C'est-à-dire pendant qu'ils(elles) écrivent leur programme, ils(elles) ont toujours une fenêtre d'ouverte puis ils(elles) peuvent avec un fureteur aller voir là un, les fiches techniques de ce dont ils(elles) se servent."

c. "Ils(elles) viennent vérifier pour communiquer avec les clients avec qui on fait les projets, parce que les projets des étudiant(e)s c'est des projets assez majeurs là. C'est fait pour des compagnies. Donc on fait de la communication avec les clients par internet, par courrier électronique."

d. "Ils(elles) ont aussi eux(elles)-mêmes, pour faire la démonstration de leur projet, ils(elles) ont aussi à bâtir une page Web qui décrit qu'est-ce qui est leur projet puis tout ça. Donc ils(elles) ont aussi à faire un apprentissage, il faut qu'ils(elles) connaissent les mécanismes de ça: comment ça fonctionne le langage HTML puis comment on peut faire des liens puis tout ça. Donc il y a cette expérimentation-là qui est faite aussi."

e. "Quand je commence mon cours, j'invite les étudiant(e)s à communiquer avec moi s'ils(elles) sont équipé(e)s à communiquer avec moi, au besoin, par internet, courrier électronique. À l'intérieur des cours, dépendamment des cours que je donne, je vais, dans tous mes cours, exiger des étudiant(e)s au moins un travail qui va les obliger à utiliser les nouvelles technologies par la recherche sur internet."

f. "Le même phénomène encore, là encore sur l'internet, on leur fait découvrir les sites de Justice Canada et l'équivalent un peu du gouvernement du Québec, qui est le bureau des publications du Québec. Alors je leur fais découvrir encore, dans un premier temps, ce que c'est, où on peut voir, dans un deuxième temps, dans l'exercice, après ça, ils(elles) peuvent trouver des articles de lois qui sont pertinentes au sujet qu'ils(elles) sont en train d'explorer."

g. "Ils(elles) vont faire des recherches sur internet."

h. "Donc ça, c'est la partie recherche (...) je les encourageais à utiliser le courrier électronique pour se coordonner entre eux(elles), étant donné qu'ils(elles) avaient des projets de recherche, un projet de session où ils(elles) étaient en équipe de deux, trois ou quatre personnes, je les encourageais beaucoup à communiquer entre eux(elles) par courrier électronique. Ils(elles) avaient, plusieurs équipes avaient organisé(e)s les résultats de leur recherche et faire des pages Web. Le seuil de réussite minimal c'était que tous les étudiant(e)s devaient être capables de faire une recherche minimale sur internet, communiquer avec le courrier électronique."

1.6 Professor (Article 1.6) Sinon, prévoyez-vous l'utiliser dans un proche futur? / *If no, do you foresee this in the near future?*

Comments: No one responded.

1.7 Professor (Article 1.7) Si tel est le cas, lesquelles croyez-vous utiliser vous-même? / *If so, what do you see yourself using?*

Comments: Only three English professors attempted predictions for the future use of computers.

a. "I would like to use the Net to research new topics."
b. "By next year, all biology students will use LogoPro and computers to share info and to go beyond the classroom."
c. "We foresee using the internet for assignments or getting information."

Professor Question (2)

Avez-vous eu l'occasion d'enseigner à des étudiants ayant des limitations fonctionnelles qui utilisaient des ordinateurs ou des technologies d'information dans le contexte de vos cours? Si oui, quel logiciel (software) ou équipement matériel (hardware) utilisiez-vous ou que les étudiants utlisaient, où les étudiants les utilisaient-ils et comment cela a-t-il fonctionné? Sinon, avez-vous enseigné à des étudiants avec des limitations fonctionnelles qui auraient pu bénéficier d'ordinateurs ou de technologies d'information dans le contexte de vos cours? Comment?

Have you had any experience teaching students with disabilities who have used computer or information technologies in taking your courses? If yes, what software or hardware did you or they use, (where did you or they use it) and how well did this work? If no, have you taught students with disabilities who could have benefited form using computer or information technologies in taking your course? How so?

2.1 Professor (Article 2.1) Avez-vous eu l'occasion d'enseigner à des étudiants ayant des limitations fonctionnelles qui utilisaient des ordinateurs ou des technologies d'information dans le contexte de vos cours? / *Have you had any experience teaching students with disabilities who have used computer or information technologies in taking your courses?*

Summary: 4 francophone and 4 anglophone professors had never taught any students with disabilities. The 4 anglophone professors who had experienced teaching students with disabilities said the following:

a. "I had a student diagnosed with a learning disability who uses a computer with special software. I once had a blind student whose impairment didn't interfere with his/her functioning but s/he left the program (not for reasons related to disability)."
b. "A student I had with a wheelchair could have benefited from help. I had a student with dwarfism. S/he couldn't see in the microscope, so I put it on a stool so it was his/her height. One student who had to stay home for weeks would have benefited from internet."
c. "Many aren't diagnosed with learning disabilities. They need to be more directed (they need more than just software)."
d. "Je n'ai pas eu de contact avec des étudiant(e)s avec des limitations fonctionnelles."
e. "Oui, on a un(e) étudiant(e) comme ça, mais je ne l'ai pas eu moi comme tel."

Comments: Some specified: "Parce que les étudiant(e)s qui ont des problèmes sérieux d'apprentissage vont suivre un cheminement plus particulier, puis je n'ai pas de contact vraiment avec eux(elles). J'ai des étudiant(e)s qui ont des difficultés, mais, comme dans une classe que je dirais entre guillemets 'normale'."

Comments: Further explanations were provided: "Ça m'est arrivé une fois d'avoir un(e) étudiant(e) avec des problèmes visuels, mais il(elle) était, selon les standards d'évaluation du centre qui est responsable de donner des services aux personnes qui ont une déficience visuelle, il(elle) entrait pas dans la catégorie des étudiant(e)s qui étaient avec un statut de handicap."

2.2 Professor (Article 2.2) Si oui, quel logiciel (software) ou équipement matériel (hardware) utilisiez-vous ou que les étudiants utlisaient? / *If yes, what software or hardware did you or they use?*

Professor Article 2.2.1 **Technologies used**

Summary: Some students used specialized equipment or specialized applications already integrated into the software.

a. "Là c'était l'équipement qui appartenait à l'étudiant(e) et lui(elle) son handicap, c'est un handicap visuel, il(elle) ne voyait rien."
b. "Il(elle) avait comme une espèce de table digitalisante, il(elle) avait un crayon spécial qui faisait les formules. Mais je ne l'ai pas vu cet appareil-là, mais je sais, il(elle) m'a raconté qu'il(elle) utilisait ça aussi comme équipement."
c. "J'ai utilisé la fonction Accessibilité de Windows. On avait comme programme, pour lui(elle), de grossissement des lettres (...) (d')inversement de fond, il(elle) travaillait sur un fond foncé avec les lettres claires, les icônes plus grands, etc. C'était la seule modification qu'on a faite."
d. "In Introduction to Business courses, I used Dragon Dictate and I pre-recorded lectures using Real Audio. We have Net meetings where we send files and class notes on the Net (can save files and expand fonts)."
e. "I taught students with all sorts of impairments, including multiple impairments. Some use sign interpreters, FM systems, laptops. The students have used many techniques, some very low-tech. There was a student in class with no speech but s/he could communicate."

Professor Article 2.2.1 **No specialized technology**

f. "C'est-à-dire (que) cet(cette) étudiant(e) est traité(e) de la même façon que les autres étudiant(e)s, donc il(elle) a accès aux mêmes logiciels que je disais tout à l'heure; le compilateur C, il(elle) utilise les mêmes logiciels, donc il n'y a pas d'autres logiciels qui sont utilisés par rapport à son problème."
g. "Les adaptations que je devais faire, c'est que je lui fournissais, si j'avais des transparents à présenter en avant, moi, je lui fournissais une copie papier. Il(elle) avait de la difficulté à lire au tableau, fait que c'est ce genre d'adaptation qui est plus de la technologie papier. Les textes, je les agrandissais. Mais le fait que tous mes documents étaient à l'écran, je faisais une sélection de mes documents et j'augmentais le font à 16 ou à 18 pour qu'il(elle) soit capable de lire de façon plus facile."
h. "No. At the time that I did have students with disabilities, there was little technology."

2.3 Professor (Article 2.3) Où les étudiants les utilisaient-ils? / *Where did you or they use it?*

a. "C'était pour l'étudiant(e) d'un cours."
b. "Il(elle) se mettait toujours au même ordinateur."
c. "I've had several students with disabilities using the computer lab."

2.4 Professor (Article 2.4) Comment cela a-t-il fonctionné? / *How well did this work?*

Summary: Among those who had had students with disabilities in their courses, some had been able to adapt their courses with or without technologies, or relied on the office for students with disabilities for assistance.

Professor Article 2.4.1 **Offices for students with disabilities**

Summary: At least three professors relied on the office for students with disabilities for assistance: they referred students there and used the office as a resource for themselves.

a. "Our program occasionally gets LD students. They are often in touch with the centre for things other than needing more time with assignments."

b. "I sit down with (staff from the office) and we work out strategies together. It seems to work."

c. Paraphrase: Others were not able to adapt: "I taught in the computer science department, and a student with a learning disability had problems and failed the course. I didn't quite know how to deal with it."

Professor Article 2.4.2 **Concerns**

Summary: Some professors had never taught any students with impairments and were concerned.

a. "No, one of my fears is to have a student with a visual impairment. I wouldn't know how to teach them without visual aids."

b. "One of my students dropped out of the course because of technology, but now s/he uses it with ease."

c. "I'm concerned about the fact that e-mail is text-based and that students with invisible disabilities will have trouble relying on text (not prepared)."

Professor Article 2.4.3 **Students with disabilities as educators**

a. "I learn a lot from students, like I spell out words I write on the board."

b. "Teaching students with disabilities has helped me become more organized (have to tape my lectures in advance), which is good."

Professor Article 2.4.4 **Technological assistance**

a. Un(e) professeur explique qu'il(elle) a utilisé différentes méthodes pour accommoder son étudiant(e): "je tapais le texte sur le traitement de texte et son ordinateur pouvait le traduire en Braille. Et là, à ce moment, il(elle) pouvait me répondre en tapant", "lorsque que je visionnais un vidéo, je m'assoyais à côté de lui(elle), moi je lui donnais les images qui étaient projetées à l'écran", "il(elle) avait beaucoup de facilité aussi avec les ordinateurs et puis il(elle) me répondait sur clavier comme une vraie secrétaire, il(elle) avait le doigté, il(elle) était très vite pour répondre" "au niveau de l'enseignement, la chose qu'on, que je fais attention, c'est de m'assurer qu'il(elle) a bien compris les consignes, que s'il(elle) n'a pas bien compris, à ce moment-là, je le(la) rencontre individuellement pour lui réexpliquer les choses. Donc c'est un peu à lui(elle) à lever un signal d'alarme s'il(elle) n'a pas bien compris."

b. Paraphrase: (L')ordinateur (qu'il(elle) utilisait à l'école) avait la possibilité quand il(elle) arrivait d'aller chercher la fonctionnalité d'accessibilité. C'était un(e) étudiant(e) qui avait pas de culture informatique, ce qui fait qu'on était au ABC. Il(elle) a quand même, au début de la session, il(elle) faisait partie de la catégorie des étudiant(e)s qui avaient même peur d'ouvrir les ordinateurs là, au moins à la fin, il(elle) était autonome pour ouvrir l'ordinateur, aller chercher son profil, et taper un peu de texte.

2.5 Professor (Article 2.5) Sinon, avez-vous enseigné à des étudiants avec des limitations fonctionnelles qui auraient pu bénéficier d'ordinateurs ou de technologies d'information dans le contexte de vos cours? / *If no, have you taught students with disabilities who could have benefited form using computer or information technologies in taking your course?*

Professor Article 2.5.1 **Different perspective on technology use in courses**

a. Paraphrase: One professor shared how technologies can be beneficial for all students: "Another component on the Web is hypertext. Putting a lot of online practice tests and putting ambiguous questions makes the students' search for the answer. This works well."

Professor Article 2.5.2 **Computers as facilitators for students with disabilities**

a. "Word processing technology has helped students with disabilities. The computer and information technology can give people a voice."

Professor Article 2.5.3 **No need for technology**

Summary: Some professors indicated that students with disabilities don't need computer technologies.

a. "J'ai eu un(e) interprète, c'était une ou deux leçons, tout simplement. Et j'ai eu un autre cas où un(e) étudiant(e) lisait, c'était un(e) handicapé(e) qui lisait lui(elle)-même sur les lèvres du prof."
b. "Non, il(elle) suit le cours, en général, il y a des notes de cours qui sont faites par le professeur, donc il(elle) utilise des notes de cours et puis il(elle) complète par des notes personnelles."
c. Paraphrase: L'étudiant(e) ne répondait pas aux critères même dans le cas de besoin: "Oui, mais sauf qu'on avait pas accès, étant donné qu'il(elle) ne rentrait pas dans, la catégorie qui avait accès à ces services-là, le fait qu'il(elle) était borderline, ça aussi ça créait des problèmes."

2.6 Professor (Article 2.6) Comment? / *How so?*

Professor Article 2.6.1 **Technologies available to assist**

a. "Parce qu'à notre cégep, justement, à la bibliothèque, il y a un local avec des appareils adaptés pour les personnes qui ont des problèmes de vision ou qui sont aveugles, mis à la disposition des étudiant(e)s du cégep et de l'université pour des déficiences au niveau visuel et aussi à toute la population. C'est un contrat de service là. C'est une entente qui a été réalisée entre l'université, le cégep, le centre de réadaptation, qui est le centre responsable des services pour les personnes avec des handicaps et ce local-là, il y a des appareils avec des lecteurs Braille, le logiciel qui traduit en sons les mots, ce qui est à l'écran, la synthèse vocale, vraiment, il y a tout, plusieurs appareils là, c'est un bel équipement. Il(elle) n'avait pas accès à ça."

Professor Question (3)

Que croyez-vous arrivera dans les cinq prochaines années en ce qui concerne les ordinateurs et les technologies d'information dans l'enseignement dans votre cégep? Prévoyez-vous des problèmes au sujet de ces technologies et de l'enseignement aux étudiants ayant des limitations fonctionnelles?

What do you see happening concerning the use of computer and information technologies in teaching at your cegep in the next 5 years? Do you foresee problems with these technologies in teaching students with disabilities?

Comments: There were 2 types of responses for this question from the English professors: what they thought would happen to professors and how they are adapting to the integration of technologies, as well as the impact technologies are having on educators.

3.1 Professor (Article 3.1) Que croyez-vous arrivera dans les cinq prochaines années en ce qui concerne les ordinateurs et les technologies d'information dans l'enseignement dans votre cégep? / *What do you see happening concerning the use of computer and information technologies in teaching at your cegep in the next 5 years?*

Professor Article 3.1.1 **Professors and students**

a. "Maintenant je serais bien mal aisé(e) de te répondre à ta question pour des étudiant(e)s ayant des problèmes fonctionnels parce qu'on n'a pas pensé en ces termes-là."

Professor Article 3.1.2 **Technologies**

a. "Ça se répand. Éventuellement, dans un premier temps, nous sommes en train d'équiper tous les enseignant(e)s, tous les bureaux où sont les enseignant(e)s, de postes, d'appareils, pour qu'ils aient accès. Alors ces appareils-là sont placés en réseau. Ensuite de ça, bon, voir au niveau des technologies, nous avons un système où les étudiant(e)s sont en mesure présentement de faire leur sélection de cours, etc., la consultation d'horaire par ce système téléphonique automatique et ça devrait être sur le Web pour la prochaine session, je pense. Et on devrait voir éventuellement apparaître le support pour les portables."

b. Comments: One professor that gave the following historical perspective of past, present, and future of technology: "The Net started in 1967, and this archaic networking system evolved into the Net. The next net wave is going to be fibre optic when we can transfer data at 40 gigabits per second (CA NET 3). You can download the Titanic film in 5 seconds (coming out in 2001 - underground cabling system). We have to adapt to this new medium, embrace this. We have to accept and adapt. The next possibility is virtual classrooms. With virtual classrooms, you have the Intranet (in school) and the Extranet (outside the city)."

Professor Article 3.1.3 **Technological advances**

a. "I don't see any problems. As technology becomes better more solutions will become available."

b. "I see more voice and text recognition (composing and editing verbally may help some students). Visual displays will be much larger and sharper and prices will drop. There will be more collaborative teamwork in class."

c. "Ce qui va se passer au cours des cinq prochaines années, c'est évidemment, c'est ce que les ordinateurs vont être plus performants, ça va demander de ces équipements, par contre, je ne prévois pas qu'il va y avoir un changement majeur au niveau, le principe va être pareil là, c'est que ça va être plus rapide, on va avoir peut-être des meilleurs écrans ou (...) l'interface usagée, d'après moi va rester à peu près pareil. On n'aura pas une interface qui va faciliter, c'est-à-dire que, par la voix ou des choses comme ça, l'interface, d'après moi, va être encore par le clavier et par la souris, je ne crois pas, d'ici, qu'on va être doté d'interfaces spécifiques qui vont être plus différentes."

Professor Article 3.1.4 **Economics**

a. "Je trouve que ça (un tel développement) reflète le besoin de formation pour s'adapter aux mutations qui se fait dans, dans le monde du travail."

Professor Article 3.1.5 **Greater use of and sensitization to technologies in teaching**

a. "Moi je te dirais, ça va prendre de plus en plus de place, ça c'est sûr. On n'a pas réfléchi en ces termes-là. Concernant l'implantation des technologies, on a pensé de façon générale pour l'ensemble des étudiant(e)s. De plus en plus, quand je te dis que ça va prendre de plus en plus place, c'est que d'abord les étudiant(e)s, on est en train de les initier tranquillement à faire l'ensemble de leurs travaux avec des outils informatiques. Je pense qu'ils(elles) sont beaucoup plus sensibilisé(e)s qu'il y a trois, quatre ans. Ça va prendre plus de place parce qu'il y a plus de profs qui vont s'en servir également. Je pense entre autres à des limitations budgétaires au niveau de l'achat de livres, de documents, etc. Alors l'internet devient un instrument assez intéressant même si dans certains cas, c'est bêtement plate, mais ça permet de pallier à des manques qui sont ailleurs assez grands."

3.2 Professor (Article 3.2) Prévoyez-vous des problèmes au sujet de ces technologies? / *Do you foresee problems with these technologies?*

Professor Article 3.2.1 **Pedagogical and institutional realities**

Summary: Some participants outlined concerns with pedagogical and institutional realities.

a. "I think we could learn a lot, need to be aware of how to. Need pedagogical training."

b. "The college is trying to get money to get more technology. But what about the function of the classroom experience. I can put my class notes on the Web (only use outlines to get from A to B). The examples I give in class are different everyday and differ in every class."

c. "In a class there is much more interaction. I don't see how technology would be helpful in my psychology class; it's more important to have discussions. I have experience with Realtime but do I want to do that in my classes?"

d. "But we need to talk to each other (social aspect of the classroom). Students need to speak, give presentations, interact (learning on a computer alone has disadvantages)."

Summary: A few expressed concerns about internet-based educational material and skills.

e. "We're sending people on the Net without any training. We haven't started analyzing how we're going to turn information into knowledge."

f. "A lot of what's on the Web isn't reliable. Students are getting access to a lot of information with no filters, and people can also download papers from the Net. I really believe that the advantages to students with disabilities far outweigh the disadvantages, for instance (for) a student that misses a lot of classes."

g. "What is disturbing is an uncritical use of teaching materials."

h. "Ben c'est certain qu'il peut y avoir de mise sur le marché certaines formes de didacticiels qui vont peut-être aider à l'apprentissage de certains concepts."

i. "Je dirais que ça amène aussi des personnes, en tout cas des profs, d'essayer de voir de nouvelles approches pédagogiques (...) entre autres en utilisant des babillards électroniques et ces choses-là. Amener les étudiant(e)s à se manifester plus, à se mouiller un petit peu plus en communiquant davantage à travers ces nouveaux outils-là. Alors dans ce sens-là, il y a un développement qui est en train de se créer là qui n'était pas envisageable, je le sais pas moi, il y a une dizaine d'années. Je ne pense pas, en tout cas, d'ici cinq ans, qu'on va intégrer ça au point où on va avoir tous nos cours qui vont être fait avec Power Point."

Professor Article 3.2.1 **Lack of money**

a. "Un manque de fric; avoir de plus en plus d'ordinateurs dans les laboratoires, ou avoir des ordinateurs qui sont pas trop vieux technologiquement, ça met une grosse pression au niveau budgétaire."

b. Mais: "(en raison du coût des machines) c'est très difficile pour les maisons d'enseignement d'être à jour avec l'équipement et avec les logiciels."

Professor Article 3.2.2 **Problems with human relations and technology**

a. Problèmes pour les étudiant(e)s: "Je pense que ça ne sera pas plus difficile (pour) ceux(celles) qui ont un handicap que les autres. Les autres ont, en tout cas, autant d'handicap avec ces technologies; certains sont très réfractaires, marginalement."

b. Paraphrase: Obstacles au développement. Un(e) a mentionné(e) que l'interaction entre l'enseignant et l'élève est trop importante pour la remplacer par un ordinateur.

c. Paraphrase: Two professors spoke of students' response to technologies. "As students are introduced to computer technologies, teachers are going to be under pressure (especially teachers that haven't used computers). In my biology classes, some of my students won't buy textbooks because the notes are on line. Some of the online courses are quite good," and another added: "Some students today have used computers since they were 2-3 years old."

Professor Article 3.2.3 **Non-technologically inclined professors**

a. "In the next five years I don't think they'll change much. In ten years, retirement will bring a new crop of teachers."

b. "Fear that teachers will become obsolete. How do we convince teachers that we greet technology? I feel like giving up sometimes. We're viewed as revolutionaries."

c. "The problem for teachers is that we have this concept of the lecture, you read book in class and the students take notes. People think they don't need to go to the classroom anymore, there's no evaluation of acquisition of skills (the exam is the evidence of competence)."

d. "Perhaps when more people retire, there will be less people left who aren't keen on integrating technology in the classroom. People should follow the (other professors) lead."

e. "I don't think that many people with high seniority will use more. Unless by force. This doesn't make them proficient."

Professor Article 3.2.4 **Obstacles for professors**

a. Se tenir à jour avec des cours ennuyants: "Ça va tellement vite, moi je pense que, un des problèmes aussi au niveau des technologies: moi, je trouve ça difficile de me tenir à date. Puis en plus les cours, j'ai suivi quelques cours donnés dans le cadre de Performa, et une fois sur deux, ce que je trouve plate c'est que ça ne correspond pas à mes besoins, on me donne trop de choses pour ce que j'ai besoin tout de suite. Il y a comme quelque chose à ce niveau-là qui serait à repenser."

b. Rassembler plus d'équipement: "Je dirais que, si on réussit à maintenir puis à développer le parc des ordinateurs, ce qui peut être l'obstacle majeur qu'on va, à mon avis, pouvoir de plus en plus intégrer ça à notre enseignement éventuellement."

Professor Article 3.2.5 **Solutions**

a. "L'hypothèse qui est plausible, si éventuellement, chaque étudiant(e) a son ordinateur, ça va être un enseignement qui va être possiblement plus individualisé. Donc plus une, donc un enseignement à distance d'une certaine manière. Peut-être moins, moins de présence dans une classe traditionnelle, puis plus de contact, je pense que ça c'est, c'est plausible. Mais ça suppose que chaque étudiant(e), par contre, ce qui n'est pas le cas actuellement, aurait un accès facile à un ordinateur. Moi je dis que ça serait, ça pourrait être intéressant, à la condition de garder quand même des contacts avec l'ensemble d'une classe."

b. "Il faut arriver avec des choses (propositions de solutions) assez précises. Le dynamisme doit venir de la base."

c. Captiver l'étudiant(e): "(Le développement de page Web par le professeur) ne nous garantie pas que les étudiant(e)s vont le voir, si on maintenait à tous les jours une page Web où il y aurait toutes les communications ou des informations en fonction du cours que tu donnes, ça ne nous garantit pas que l'élève va le voir. C'est à lui(elle) de le faire là."

d. "Mais si on individualise de cette façon (où l'étudiant(e) a son propre ordinateur) là, moi, je suis convaincu(e) qu'avec le nombre d'étudiant(e)s que j'ai, par exemple, c'est presque que cent cinquante à cette session-ci, ça va être impossible."

e. "C'est qu'il faut s'habiliter à les utiliser (...) je ne suis pas encore très habile à l'utiliser, on l'a acheté, on l'a fait venir, il est dans nos appareils, mais je dois m'auto-former moi-même avant de le présenter aux étudiant(e)s."

Professor Article 3.2.6 **Computer-related problems**

a. Le manque de fiabilité explique la frustration des usagers: "Un des problèmes est souvent lié à la fiabilité des équipements; l'informatique n'est pas fiable et une source de grandes frustrations. Le support n'est pas là, pour aider non plus, donc il y a des problèmes aigus de budget qui sont liés justement à l'absence de support, qui donne un manque de support. Et ces appareils-là ne sont pas, moi je dis, on a souvent beaucoup d'ennui technique."

b. "Je trouve que le réseau arrive souvent à des situations erronées, il n'a peut-être pas passé à travers toutes les, les possibilités que les étudiant(e)s peuvent faire là, parce que (...) il ne faut pas oublier que ce qu'on a en arrière de la machine, c'est des personnes qui sont en situation d'apprentissage, donc s'il y a une façon de mal utiliser la machine probablement que c'est la gang qui va le faire. Et puis ça fait que souvent son poste tombe en panne."

Professor Article 3.2.7 **Perceived problems with technologies during this transitional time**

a. "The problems I see with the DVD, it will be available on some central server (anything that involves video/audio will now be accessible. At (our college) we have old technology, we have a Proxima device but it's hard to use. Another problem will be training. There is also a problem with social skills and virtual classrooms: we do lose out (lack of personal contact)."

Professor Article 3.2.8 **Discrepancies between departments**

a. "Il y a des écarts, il y a des départements où ils sont beaucoup avancés ou qui utilisent beaucoup les technologies. Par contre, il y a d'autres programmes où ça semble être moins évident, comme en sciences humaines. Il faut pousser beaucoup, il faut être nous-mêmes comme prof convaincu que les technologies amènent un plus pour avoir un écho parce que la direction ne pense pas spontanément à nous. Ils vont penser informatique, nouvelles technologies, plus spontanément pour les sciences pures, les sciences de la nature ou les langues. Je pense que c'est beaucoup selon les programmes."

b. "Et les technicien(ienne)s qui, en informatique, ils ne sont pas habitué(e)s de travailler avec des gens qui sont en sciences humaines, ce qui fait qu'ils ont moins d'information. Ils sont très à date pour aider les gens en informatique, il y a un bassin aussi au niveau de l'administration puis de la comptabilité, il y a comme plusieurs personnes qui, qui connaissent les logiciels, puis qui les utilisent, mais (dans mon département), je suis celui(celle) qui est le(la) plus au courant fait que des fois je me sens tout(e) seul(e)."

Professor Article 3.2.9 **Purchasing constraints**

a. "La difficulté de choisir quel (logiciel) qui est meilleur. J'avais un petit budget pour acheter des logiciels éducatifs, mais avant de me décider, il a fallu que je cherche les informations, c'est long ça. Étant donné qu'on n'a pas beaucoup de budget, faut rentabiliser au maximum nos achats et c'est pas toujours évident."

3.3 Professor (Article 3.3) Problèmes dans l'enseignement aux étudiants ayant des limitations fonctionnelles? / *Do you foresee problems in teaching students with disabilities?*

Professor Article 3.3.1 **Unequal access to adaptive technologies**

a. "Je te dirais le principal inconvénient, c'est des étudiant(e)s qui sont nettement privilégié(e)s par rapport à d'autres, ceux(celles) qui disposent de l'équipement chez-eux(elles) qui leur permettent d'avoir un accès prolongé à ces équipements-là durant la semaine. Alors qu'ici, notre, notre lab on peut l'ouvrir environ, sept, huit heures par jour, pas plus. Alors les étudiant(e)s qui ont des moyens financiers, ont aussi moyens d'avoir cet équipement-là chez-eux(elles) et évidemment de travailler de façon plus soutenue avec ces équipements-là."

Professor Article 3.3.2 **Time with the students**

a. "Un problème quand on a des étudiant(e)s qui ont des handicaps, moi j'en ai pas eu, mais en tout cas, de ce que j'entends parler, c'est le temps qu'on a besoin de consacrer à ces étudiant(e)s par rapport aux autres est comme un peu plus élevé. Si on a beaucoup de ces étudiant(e)s-là dans une classe, ça devient difficile, mais ce n'est pas un problème, mais dans le cas s'il y avait beaucoup de ces étudiant(e)s. C'est sûr que le fait d'utiliser des technologies d'information, c'est pour nous rendre service, il y a du boulot à faire pour préparer le matériel pédagogique pour ça. Ce n'est pas nécessairement fait. Tu sais, c'est tout à faire ça. C'est du travail que les profs doivent créer. Ce n'est pas toujours évident de le faire surtout pour une personne qu'on a une fois par année."

Professor Article 3.3.3 **Cost and availability of training**

a. "Donc, étant donné qu'il(elle) doit cadrer dans l'organisation, comment fonctionne ici le cégep, il(elle) (étudiant(e)) ayant une incapacité est obligé(e) de suivre les cours au moment où ils se dispensent. Ça serait comme trop dispendieux ou pratiquement impossible de faire de quoi plus sur mesure pour une ou deux personnes."

Professor Question (4)

Votre cégep vous offre-t-il les ressources ou l'expertise qui vous aiderait à utiliser plus efficacement les ordinateurs ou les technologies d'information dans l'enseignement aux étudiants ayant des limitations fonctionnelles? Si oui, s'il vous plaît, décrivez la situation. Sinon, indiquez si cela serait utile et que faudrait-il pour rendre cette situation possible.

Does your cegep provide you with resources and/or expertise to help you use computer and information technologies in teaching students with disabilities more effectively? If yes, please describe this situation. If no, please indicate whether this would be useful and if so, what could be done to accomplish this.

4.1 Professor (Article 4.1) Votre cégep vous offre-t-il les ressources ou l'expertise qui vous aiderait à utiliser plus efficacement les ordinateurs ou les technologies d'information dans l'enseignement aux étudiants ayant des limitations fonctionnelles? / *Does your cegep provide you with resources and/or expertise to help you use computer and information technologies in teaching students with disabilities more effectively?*

Professor Article 4.1.1 **Professors are self-taught**

a. "Bon, ce qu'ils nous offrent à venir jusqu'à date, c'est très, très peu. Le reste, je pense c'est chaque individu qui a pour responsabilité de le faire lui(elle)-même en dehors de sa "job", qui le fait sur le bras, parce que le soutien de la part des institutions, ça repose sur l'initiative individuelle initialement."

b. "Dans notre cas, ce n'est pas vraiment un problème parce que comme c'est notre domaine, on est assez autonome là-dedans. On est assez autodidacte. Il y a des fois, des cours de perfectionnement qui vont se donner."

c. "Oui, j'en ai suivi, mais (en) très grande partie j'étais autodidacte."

Professor Article 4.1.2 **Training offered by the cegeps**

a. "Si je le (le cours) termine, j'ai un remboursement de mon cégep. Ça fait partie de la formation continue, des programmes de perfectionnement."

Comments: Training courses mentionned were: "cours Performa", "formation continue".

b. "C'est certain que le collège offre du perfectionnement soit didactique ou pour l'utilisation de certains logiciels, mais je ne crois pas à ma connaissance que ce soit des logiciels qui sont spécifiquement liés aux problèmes que vous avez cités là."

c. "Notre cégep comme dans tous les cégeps, ils offrent un programme de formation, un service de secrétaire."

d. "Si un professeur veut se mettre à jour avec les technologies, il(elle) a juste à s'inscrire dans différents cours, il y a quand même une bonne panoplie de cours puis quand il y en a pas, ben des fois, on peut demander un cours fait sur mesure."

e. "Mon cégep qui offre de la formation à ce moment-là, c'est le centre de réadaptation."

Professor Article 4.1.3 **Assistance from others in the cegeps**

a. "Ils offrent un support selon les besoins du professeur, à la pièce, dépendant de c'est quoi l'handicap et les besoins, et du prof et de l'étudiant(e), donc on ajuste aux besoins."

b. "Il y a aussi une personne dans mon cégep qui est responsable d'adapter les services pour les personnes qui ont des limitations fonctionnelles, c'est (le)la travailleur(euse) social(e)."

c. "Il peut y avoir, dans le cas de mon étudiant(e) qui avait un handicap visuel, il(elle) m'avait demandé(e) à ce moment-là, si ça posait problème pour moi, de fournir des fichiers sur WordPerfect, à ce moment-là, j'ai dit non, mais probablement si j'avais dit oui, il(elle) m'aurait probablement offert un service de secrétaire pour rentrer mon texte sous la forme fichier. Donc c'est vraiment au besoin. Et c'est vraiment à la pièce. Les budgets, ce n'est pas moi qui gère ça, je ne peux pas vous dire comment ça fonctionne, mais je sais qui, qu'ils avertissent le prof lorsqu'un(e) étudiant(e) qui a une limitation."

d. "Habituellement on a deux technicien(ienne)s qui sont plus accrédité(e)s à ça, mais ça dépend de c'est quoi le problème, si c'est un problème mineur, on va essayer de régler nos problèmes nous autres même, mais des fois, ce n'est pas juste l'imprimante, il peut y avoir un problème avec soit le réseau ou l'ordinateur au niveau de la configuration ou des choses qui ont été perdues, quand ça vient à jouer soit dans la configuration ou des choses comme ça, étant donné que le(la) technicien(ienne) préfère qu'on aille le(la) chercher pour qu'il(elle) soit au courant des problèmes, pour que, si jamais ça se reproduit, il(elle) puisse le régler de façon définitive, donc on a tendance à aller chercher le(la) technicien(ienne) pour faire régler le problème. Ça peut arriver des fois, on peut aller jusqu'à dix-huit (18) (ordinateurs), mais, on a actuellement, un ou deux postes libres. Fait que s'il arrive un problème, la façon la plus simple, habituellement, si c'est un problème qui est d'envergure moyenne ou plus, on va faire transférer l'étudiant(e) sur un autre poste pour qu'il(elle) continue son travail."

e. "The college is more inclined to provide hardware and software and less to give to people (expertise, training). We need expertise to help us learn. Most teachers end up helping students, but the institution never seems to reward that."

Professor Article 4.1.4 **Disabled students services office offers assistance with technologies**

a. "The college does support technology for students with disabilities. We have two dedicated people who learn as much as they can, and we rely heavily on them (DSS office). They are part of the college."

b. Paraphrase: "I've worked with DSS personnel to help students with disabilities." This also the case with technology. Three other professors expressed this sentiment.

Professor Article 4.1.5 **What the college provides in terms of technology**

a. "The college provides us with hardware (server) where we can upload notes."

b. Committees determine what technologies should be applied. They continue using Windows and Office 95. As new computers are available we could use more updated equipment."

4.2 Professor (Article 4.2) Si oui,s'il vous plaît, décrivez la situation. *I If yes, please describe this.*

a. "On a accès à certains cours Performa qui sont offerts par l'Université de Sherbrooke évidemment bons pour ce qui est de l'apprentissage de certains logiciels, des nouvelles technologies."

b. "Nous, on a eu en sciences humaines des formations sur les nouvelles technologies dans l'enseignement et on a même eu un projet fort intéressant, financé et par le collège (et) par le ministère de l'Éducation, puis aussi la compagnie Apple. Et à l'intérieur de ça, il y avait évidemment de l'équipement, mais il y avait des formations sur mesure, vraiment, qui nous ont été fournies un an, un an et demi. Systématiquement on a eu des formations de toutes sortes sur l'intégration des nouvelles technologies. Maintenant, le financement de ça est fini, mais on fonctionne relativement bien. C'est sûr que, au besoin, s'il y a du financement, le collège est ouvert à nous, à nous aider, pas à payer, mais à essayer de trouver de l'argent parce que là ils sont limités tout le temps. C'est pour nous aider à trouver des subventions, aller chercher des subventions. Dans notre cas, en tout cas, ils appuient assez bien les projets qu'on leur a soumis, et ils nous aident à trouver du financement. Ç'a été d'abord une initiative des professeurs, mais à la lumière des informations qu'on avait sur des programmes de formations qui étaient disponibles. C'était durant les heures de travail, c'est sûr pas pendant nos périodes de cours (...)"

c. "Les cours consistaient à l'apprentissage de l'utilisation de l'internet par les étudiant(e)s, aux réseaux de concepts et à l'adaptation aux nouveaux équipements."

d. "On a eu des contacts avec des gens qui avaient de l'expérience du Collège Bois-de-Boulogne entre autres là, de la gang des APO, qui sont venus nous donner soit des conférences, dans certains cas, des formations."

4.3 Professor (article 4.3) Sinon, indiquez si cela serait utile et que faudrait-il pour rendre cette situation possible? / *If no, please indicate whether this would be useful and if so, what could be done to accomplish this?*

Professor Article 4.3.1 **Lack of information**

Summary: One participant is in favor of training, whilst the others appear to uninformed on the topic.

a. "Je peux difficilement répondre, je ne connais pas de programme qui directement est lié à ça."

b. "Mais actuellement, je ne crois pas qu'il y ait de quoi, mais je dis ça sous toute réserve là parce que j'en suis pas sûr(e)."

c. Following instructions: "Mais je n'ai pas fait de recherche non plus parce que j'avais seulement un(e) seul(e) étudiant(e), puis en tout cas, moi, j'ai commencé la session, je vais voir ce que ça va donner puis, j'ai demandé aux autres professeurs des autres sessions qui l'avaient eu, qu'est-ce qui, qu'est-ce qu'ils ont fait. Le premier besoin, c'était plus de temps pour les examens et les travaux en classe, le deuxième besoin ça pouvait être un lecteur ou une lectrice sur cassette. Ça, moi, je n'ai rien fait là-dessus, ç'aurait été à lui(elle), s'il(elle) avait voulu(e), il(elle) aurait pu enregistrer mon cours, c'était marqué, c'était notre responsabilité, la nôtre d'en assurer ce service, mais là, moi, quand je l'ai rencontré, il(elle) ne m'a pas fait part de ça. Un preneur ou une preneuse de notes, ça, il(elle) aurait pu avoir ça, et puis qu'ils disaient de faire attention aux fautes en français. Il(elle) a décidé(e) de lui(d'elle)-même de ne pas en faire, puis, dans tous les cours qu'il(elle) a suivis, il(elle) n'a jamais enregistré(e) les cours."

Professor Article 4.3.2 **Need for greater resources**

a. "Ça serait souhaitable qu'il y ait plus de ressources qui soit mises en place."

Professor Article 4.3.3 **Need for more human resources**

a. "Je parle de dégager des gens pour préparer des documents parce que je pense qu'il y a bien des choses au niveau collégial, on a pratiquement rien de didacticiel qui sont propres à nos cours. Je pense qu'il devrait y avoir des gens dégrevés pour préparer justement ce matériel-là dans toutes sortes de discipline, ça s'impose. Ça, ça urge même."

b. "C'est certain que s'il y avait plus de monde. Si on faisait une demande. Si, par exemple, il arrivait un groupe puis qui avait huit personnes qui seraient dans une situation à peu près comparable, puis qu'on demandait de l'aide au collège, je pense que le collège accepterait de nous apporter un support ou de trouver une personne pour apporter un support."

Professor Article 4.3.4 **Need for more training**

a. Paraphrase: The training of students should occur with the acquisition of technologies.

b. "Someone who could train students to use it."

Professor Article 4.3.5 **Need for faster hardware and software**

a. "We need to convince the government that they have to fund technology more."

b. "We have a server that's available because of one professor's aggressiveness. Funding for computers is met by adversity by those most technologically inclined. It seems like it's better to take two steps back instead of forward. Despite the institution, people like (Professor X at our college), keep things going."

Professor Article 4.3.6 **Need for funding for technology for students with disabilities**

a. "My wish list would be to have the best equipment. We've kept WordPerfect 5.1 and Windows 3.1 too long."
b. "The college doesn't supply a structure where we could work as a team. We all work in our own offices, but we're not connected enough, no synergy."
c. "I'm comfortable with new technologies, but it takes a lot of time. There's a lot more resources available that aren't being tapped. How do I merge technology with pedagogy? I don't have time to get the experience."

Professor Question (5)

Qu'est-ce qui fonctionne bien dans le domaine des technologies informatiques et technologies d'information et où voyez-vous les problèmes majeurs pour vous et les étudiants ayant et n'ayant pas des limitations fonctionnelles dans votre cégep? Quelles solutions envisageriez-vous face aux problèmes mentionnés?

What works really well in the use of computer and information technologies at your cegep and what do you see as the key problems for you and your students, both with and without disabilities? What are some possible solutions to the problems that you mentioned?

5.1 Professor (Article 5.1) Qu'est-ce qui fonctionne bien dans le domaine des technologies informatiques et technologies d'information de votre cégep / *What works really well in the use of computer and information technologies at your cegep?*

Professor Article 5.1.1 **For the students**

a. "Ben moi, je pense qu'est-ce qui fonctionne bien c'est le fait que les étudiant(e)s acceptent et travaillent avec des nouveaux instruments, ça leur permet de se développer à travers ces nouveaux instruments-là, à développer leur créativité, à développer leur sens de l'initiative, leur autonomie, de les amener à être plus autonomes, de les amener à plus d'ouverture, ça aussi ça fonctionne bien. Mais, c'est aussi une source de gratification importante parce que, quand les étudiant(e)s ont terminé(e)s leur recherche, ils(elles) ont réussi à produire un document qui est d'une qualité du reflet exceptionnel. Ça permet à ce moment-là, moi, je pense que les étudiant(e)s sont fier(e)s de leur production finale, puis ça c'est valorisant à la fois pour le prof et à la fois pour les étudiant(e)s d'avoir ces choses-là."
b. "Beaucoup de ces outils-là permettent de faire de l'enseignement individualisé où la personne est capable de croître à son rythme. Les étudiant(e)s doivent maîtriser ces choses-là s'ils veulent être opérationnels(elles) quand on parle de formation collégiale."
c. "Là, si je veux former des étudiant(e)s pour le marché du travail à la fine pointe, je n'ai pas le choix (...) Il faut que je leur montre qu'est-ce qu'il y a au niveau technologique."
d. "Je dirais que, ce qui fonctionne bien, les étudiant(e)s aiment très souvent ce genre de choses-là."

Professor Article 5.1.2 **Technology can facilitate the learning process**

a. "Calculating the reaction of a circuit goes faster on the computer, it expands time and the geometry scale (size). Real life things can be expanded even geographically (e.g., monarch butterflies). The Net allows you to be anonymous (through e-mail). (It) helps (you) to see (the) final product versus how (it) got there. (You) could even have (a) "virtual meeting."
b. "L'outil, il nous permet de faire des choses qui sont impensables autrement. Il y a des simulations, des mises en situations qu'on peut faire qui sont impensables sans ces outils-là. Je

pense dans beaucoup de choses, ce sont des outils, tout simplement au niveau financier, des chiffriers qui permettent de faire des choses qui étaient impensables avant l'arrivée de l'informatique. Je pense à des simulations qui nous permettent de visualiser certaines choses soit dans les domaines physiques, même, il existe un ensemble de logiciels spécialisés dans toutes sortes de champs pointus qui permettent de recréer des situations. Je pense au simulateur de vol, toutes sortes d'éléments qui nous permettent de recréer des phénomènes physiques ou des phénomènes sociaux qui (aident) à saisir facilement. Alors c'est des outils merveilleux qui ont une grande place. Là, le Web, qui est une encyclopédie du globe, alors c'est l'accès à une information qui avant était pas disponible. Ce qui améliore grandement l'enseignement, le met à jour, le rend stimulant. Je veux dire, on se rend compte qu'ils sont dans la vraie vie, c'est du vrai monde qui est là. Alors ils(elles) (étudiant(e)s) sont au fait. Alors cette partie-là, elle est merveilleuse. Je n'ai pas de doute, ce n'est pas plus négatif qu'avant, c'est un autre outil supplémentaire qui donne des choses merveilleuses."

c. "I like to use computers in the classroom. It allows for the distinction to be made between information and what to do with it. Students prefer to download information at home and come to class to ask questions. Computers are good to make science a living thing. Students learn that data is outside of you."

d. "Instead of putting lectures on tape, get students to pre-record their questions or answers. There is a value to actually doing the experiment in real life, but using lab simulations can advance time (e.g. in ecosystems, manipulate environment to see what happens). We can't go on field trips due to lack money. It's hard to go beyond visuals and verbal statements in biology. Some of these huge TV.'s might be good for visually handicapped students."

e. "The use of tape recordings make students passive recipients. How can you ask questions? As a teacher, my goal is to see that (that) student has taken in something from the course. The fact that (a) student has assimilated material is more important than how they assimilate it. The technology allows the student to show me that they have assimilated the material."

f. "In the English department, using technology is something outside of them (it's not writing on paper). The computer labs allow the transition to occur painlessly. The math department sees rapid progress in some students. Having the Net open to students (research) may be positive."

Professor Article 5.1.3 **For students with disabilities**

a. "Si l'étudiant(e) a l'appareil, un ordinateur, ça élimine beaucoup les complications parce que à ce moment-là, il(elle) a lui(elle)-même déjà tout l'équipement de base. Moi, c'est comme ça que je vois ça, parce que j'ai vu des gens qui se déplaçaient avec leur portable, qui avaient les logiciels adaptés et les logiciels qu'ils avaient de besoin eux(elles)-mêmes."

Professor Article 5.1.4 **The technology itself**

a. "Mais disons, que dans un même département, ça va assez bien en général. Si dans l'éventualité on voudrait aller au-delà de ça, dans d'autres collèges, mais là, les gens ne travaillent tous pas nécessairement avec les mêmes outils. Des fois il peut y avoir des petits problèmes. Mais en général, c'est de moins en moins le cas. Les logiciels sont de plus en plus polyvalents, c'est-à-dire qu'ils peuvent accepter des fichiers de toutes sortes de formats, puis il y a un gros développement (...) la compatibilité est de plus en plus vraie. Avant c'était un rêve, maintenant, c'est plus la réalité. Le fait aussi que les appareils intègrent beaucoup de multimédia, c'est intéressant qu'il y ait des haut-parleurs, ça donne des possibilités supplémentaires."

b. "Oui. Ben en général, on peut dire que ça s'est amélioré beaucoup par rapport aux années précédentes au niveau de tout ce qui est de la partie réseautique, mais au niveau d'aussi des ordinateurs, au niveau de la fiabilité, c'est-à-dire qu'on a accès quand même à soit internet ou soit d'autres choses comme ça. Puis, on peut dire qu'en général c'est relativement fiable et que notre accès est correct."

5.2 Professor (Article 5.2) Où voyez-vous les problèmes majeurs pour vous? / *What do you see as the key problems for you?*

Summary: Three professors expressed pedagogical concerns ranging from the way technologies change the methods of teaching to lack of support from administration: "Technology changes the way in which we teach. I found myself becoming more formal. The spontaneity's gone."

Professor Article 5.2.1 **Its use in teaching**

a. "Ça se fait à la pièce, ça se fait avec de l'expérimentation, tu vois à l'intérieur de tes cours, qu'est-ce qui a marché, qu'est-ce qui a marché moins bien. On a des équipements pas de problème, on a même des équipements assez performants, mais on ne peut pas utiliser toute la performance de ces appareils-là habituellement, tout le potentiel parce que ça demande une énergie folle, passer des heures et des heures avec des étudiant(e)s au labo (...) c'est l'encadrement de tout ça qui doit être repensé parce que comme je te dis, ça se fait de façon assez décousu. C'est quand même assimilable, (mais) ça vient essoufflant à la longue."

b. "Et puis un des problèmes, important à mon avis, c'est que, les nouvelles technologies, ce n'est pas magique non plus. Puis des fois les gens sont déçus parce qu'ils espéraient résoudre ou trouver des solutions à des problèmes de façon plus magique par ces outils-là, puis ce n'est pas nécessairement ça que ça donne comme résultat là. Il faut prendre ça comme étant un outil d'apprentissage, fait que ça ne convient pas nécessairement de la même manière à tout le monde, il y a des difficultés comme ça."

c. "Il y a plein de technologies qui sont intéressantes, mais que moi, je fais juste savoir que ça existe, que je n'ai pas manipulé, que je ne serais pas capable d'utiliser, dans le fond. C'est que là, la notion d'information, puis il y a la notion d'utilisation. Moi, il y a plein de choses que je ne serais pas capable d'utiliser actuellement."

Professor Article 5.2.2 **Maintenance**

a. "L'entretien régulier des sites, c'est un problème. Au niveau des machines comme telles, si on réussit à se tenir à date, puis que nos laboratoires changent à tous les cinq ans, ben c'est pas si pire, mais là, c'est un rêve. Changer à tous les cinq ans, des fois c'est plus que ça là. Ça c'est sûr, que ça aussi ça met de la pression. Au niveau des systèmes d'exploitation, pas mal tout le monde est standardisé, il y a beaucoup de gens qui utilisent Windows et tout ça, fait que, à ce niveau-là, il n'y a pas trop de problèmes. Par contre, pour s'échanger des informations entre collègues ou entre (...) des fois ça peut être un problème."

b. "Ce qui pourrait être amélioré, c'est au niveau de la rapidité, en général, au niveau du serveur du réseau et tout ça, on va probablement essayer d'améliorer ça, au niveau d'internet. Parce que les logiciels qu'on achète, les nouveaux logiciels qu'on achète sont de plus en plus énergivores. Ce qui fait que ça prend des machines relativement performantes pour tout ce qui est des nouveaux logiciels qu'on utilise. Donc, c'est ça qui, je pense qu'il va falloir prioriser, mais le problème, c'est : c'est un gouffre sans fin. Si je regarde ça d'un point de vue économique, dans le sens que, à tous les trois, quatre ans, c'est des montants assez astronomiques qui sont mis là-dedans, qui sont à renouveler, puis la valeur résiduelle de l'équipement... souvent, elle ne vaut plus cher. Donc c'est ce que je pense qu'il va y avoir."

c. "Ben, recycler, ce qui est difficile, c'est qu'il y a des parties, comme je te dis, l'interface d'entrée qui est le clavier qui est assez en bonne condition, après cinq ans, c'est plus ou moins convenable et le moniteur où on pourrait peut-être récupérer, mais c'est certain que, à l'autre bout de la chaise musicale, j'ai juste des 486, des X33, plus ou moins performants, sans lecteur de cédé, sans rien. Tandis que dans certains autres labs, ils sont beaucoup mieux équipés, mais à cause de la quantité d'étudiant(e)s et tout ça, ce n'est pas possible qu'on aille tous dans le même laboratoire. Donc, oui, on va continuer à faire du recyclage, c'est sûr, dans le sens qu'on les ramène tout le temps, mais, si on a commencé avec dix-huit ordinateurs dans les labs, après cinq ans, on en recycle pas dix-huit."

d. "J'ai eu des budgets pour acheter des logiciels, l'année passée, maintenant c'est tout sur cédérom (...) et je n'ai pas d'appareil pour utiliser les logiciels (...) Je n'ai pas de lecteur cédérom, je n'ai pas d'appareil multimédia."

Professor Article 5.2.3 **Impossible to predict**

a. "J'ai de la difficulté à voir vraiment, à long terme, comment ça va se développer parce que j'ai l'impression qu'il y a aussi des nouvelles technologies qui vont apparaître, qui vont encore possiblement modifier passablement nos façons de faire sans savoir exactement dans quel sens."

Professor Article 5.2.4 **Concerning teaching**

a. "I don't see any new problems – time, space, resources need to be budgeted, getting people excited about new things. Solutions – just keep on."

b. "Je disais, par exemple, le problème du nombre d'étudiant(e)s. Si on s'oriente vers un enseignement éventuellement un peu plus à distance et un peu plus individualisé (à l'aide de l'informatique), ça suppose d'abord, les profs, qu'on change un peu notre façon de faire, mais je pense que s'il y a trop d'étudiant(e)s, on risque d'avoir des problèmes et eux aussi éventuellement."

c. "On a toujours une partie de la population qui est réfractaire à ces modes d'enseignement, d'usage de ces outils-là. Cependant, il y a des limites à ce phénomène-là, il y a une partie de la population qui est capable de fonctionner comme ça. Au moins 50% de la population qui ne sera jamais capable de fonctionner de manière très autonome. Alors, ça ne correspond pas à leur mode d'apprentissage, à leur personnalité, alors ils ont besoin de classes, de situation dans laquelle il y a un prof qui dit: 'Bon, aujourd'hui, on fait ce genre de chose-là'."

Professor Article 5.2.5 **Concerning internal support**

a. "Wholesale acceptance of technology without critical assessment."

b. "The college is what administration is all about. We need formal support mechanisms. The college should support the individuals."

c. "On en a perdu quelques-un(e)s (de nos technicien(ienne)s informatiques) avec quelques années, mais on en avait pas beaucoup, mais mettons, les quelques-un(e)s qu'on avait sont moins disponibles."

d. "Le réseau n'est pas infaillible, les machines ne sont pas infaillibles ou c'est l'équipement qui est trop vieux, ou bien c'est le personnel qui donne le support, qui doit se diviser la tâche en peu de personnes, puis il y a plusieurs laboratoires à couvrir. Je vois très bien c'est pas la mauvaise volonté, je pense que les gens veulent bien faire, veulent offrir le service, mais on a des problèmes, des contraintes budgétaires."

5.3 Professor (Article 5.3) Où voyez-vous les problèmes majeurs pour les étudiants ayant des incapacités? / *What do you see as the key problems your students with disabilities?*

Professor Article 5.3.1 **Cost**

a. Les équipements technologiques sont "relativement dispendieux si on parle juste d'équipement sans les logiciels, facilement 2000$ et puis au bout de trois ans, qui est après une formation technique, son équipement (de l'étudiant(e)) est déjà rendu désuet. Fait que c'est 2000$ investi qu'il faut réinvestir, ils peuvent même pas s'en servir comme équipement de travail là."

Professor Article 5.3.2 **Student's reservations**

a. "J'en ai eu un(e) étudiant(e) ce matin qui est venu(e) me voir, puis il(elle) a la phobie des ordinateurs, il(elle) a peur de ça pratiquement."

5.4 Professor (Article 5.4) Où voyez-vous les problèmes majeurs pour les étudiant(e)s n'ayant pas des limitations fonctionnelles dans votre cégep? / *What do you see as the key problems your students without disabilities?*

Professor Article 5.4.1 **In teaching**

a. "Ce qui fonctionne moins bien c'est tout l'encadrement de ça (de l'utilisation d'ordinateurs dans l'enseignement), parce que ce qui manque au fond, c'est une vision globale de l'ensemble de ça Ce qui manque, c'est une approche globale par l'intérieur, dans les cours au niveau collégial, parce que tout ça, ça se fait à la pièce."

b. "Ce que je veux dire c'est qu'un cours de traitement de texte tout seul qui n'est pas intégré au cours du programme, ou si les étudiant(e)s ne peuvent pas les utiliser immédiatement, c'est moins efficace."

Professor Article 5.4.2 **How technologies are accessed**

a. "Il y a l'accès, ce n'est pas tous les étudiant(e)s qui ont nécessairement un accès Par exemple, l'internet, beaucoup l'ont, mais ce n'est pas tous les étudiant(e)s, donc ça peut être un problème Donc c'est une forme d'handicap ça, dans le fond, d'une certaine façon. Ils sont défavorisés un peu par rapport aux autres."

b. "Un problème majeur, c'est l'accessibilité aux laboratoires, on n'a pas assez de laboratoires, nos étudiant(e)s n'ont pas accès aux laboratoires, il y a des problèmes d'horaire (...) Je vais juste conter une petite histoire, mes étudiant(e)s actuellement ont des présentations de projets à finir, le laboratoire où ils(elles) y avaient accès deux soirs par semaines, ben il y a deux semaines, il a été fermé, ils(elles) n'ont plus accès à ce laboratoire-là, fait que j'avais des étudiant(e)s qui étaient pas mal malpris(es) pour finaliser leur projet, parce qu'ils(elles) n'avaient pas d'appareil, ils(elles) n'avaient pas d'ordinateurs chez-eux(elles). Nous, on a un tout petit laboratoire informatique avec six appareils, mais on a comme les appareils qui viennent des laboratoires qui ont les appareils qui viennent des laboratoires plus performants. Nous, on est troisième ou quatrième, mais après nous, ils s'en vont à la poubelle. OK, ça fait que on n'a pas des appareils très performants. Ça fait qu'il y avait des étudiant(e)s qui faisaient des travaux avec des logiciels qui n'étaient pas sur nos appareils."

Professor Article 5.4.3 **Problems with internet information**

a. "Some students plagiarize off the Net."

b. "There's a lack of critical attitude towards the Net (i.e., questioning sources on the net, we have to relearn it)."

c. Paraphrase: Three professors identified the cost of technologies as a problem.

d. One identified more than just financial concerns: "There are financial and attitudinal problems Some teachers are only starting to use overhead projectors."

e. "The financial problem is that we can't afford everything."

5.5 Professor (Article 5.5) Quelles solutions envisageriez-vous face aux problèmes mentionnés? / *What are some possible solutions to the problems that you mentioned?*

Professor Article 5.5.1 **More human resources**

a. "C'est de dégager des gens, qu'il y ait des ressources qui soient allouées, pour justement intégrer l'ensemble de la formation."

b. "Plus d'équipement, de soutien pédagogique avec des conseillers pédagogiques."

Professor Article 5.5.2 **Recycling**

a. "Il y a des choses qu'on peut faire; un peu de recyclage, c'est-à-dire que ça dépend. Il y a certains éléments qui après quatre, cinq ans qui sont usés, comme si je prends par exemple le clavier, mais c'est des éléments pas dispendieux, mais le clavier, c'est habituellement après cinq ans, c'est presque hors d'usage, on va peut-être pouvoir récupérer certaines sections comme le moniteur ou des choses comme ça. Mais encore là, le moniteur ici, l'usage, c'est environ 35-40 heures semaines, ou c'est toujours actifs, après cinq ans ou même avant, on a des problèmes au niveau des couleurs, au niveau de la mise au foyer, au niveau de plein de choses. Par contre, la solution, elle vient que les machines, depuis deux ans, ont diminué beaucoup, fait que ça va nous aider à ce niveau."

Professor Article 5.5.3 **Compulsory training for students**

a "On a proposé au collège de faire une espèce de cours ou de formation qui serait comme obligatoire pour tous les étudiant(e)s. D'abord pour les mettre au même niveau face à l'utilisation des appareils, puis ensuite, comme nous on utilise l'internet, ben, la même chose pour les amener à avoir une base commune au niveau de la recherche sur internet. Mais là, c'est un projet, ce n'est pas acquis encore."

Professor Article 5.5.4 **Solution to improve teaching**

a "(Un) nombre d'étudiant(e)s qui seraient à mon avis acceptable. Du temps de formation, aussi, supplémentaire."

Professor Article 5.5.5 **Solutions are difficult to implement**

a "Ce n'est pas vraiment un problème qui va être vite réglé (la peur des ordinateurs). Donc il faut que je lui permette d'établir un contact avec la machine pour lui montrer que c'est pas dangereux, avant de lui montrer comment l'utiliser et comment aller sur l'internet parce qu'il(elle) veut rien savoir de ça."

Professor Article 5.5.6 **Wish List**

a Plus d'équipement: "C'est sûr que plus j'ai de l'équipement, plus c'est facile pour l'étudiant(e). Des fois on se pose la question: "Est-ce qu'on va en venir un jour à exiger que les étudiant(e)s apportent sa machine comme ils(elles) apportent ses cahiers et ses livres? Je ne le souhaiterais pas, mais c'est peut-être quelque chose qui va faire qu'on va soulager un peu les budgets des collèges."

b Meilleur performance: "Également, qu'est-ce qui va s'améliorer là-dedans, ça va probablement (être) les points qui vont être le plus à s'améliorer, ça va être d'avoir des ordinateurs plus performants, un serveur plus performant, un réseau plus performant, un accès internet plus performant."

c Avoir de l'information: "Je rêve de, peut-être, d'avoir des programmes de formation en formation continue pour avoir (les) informations, ou bien organiser une journée avec les gens du cégep qui seraient appelés à utiliser ces technologies-là, etc. avec des personnes qui s'y connaissent. Mais il faudrait qu'on intègre les personnes du réseau scolaire qui sont appelés à travailler avec des personnes qui ont des limitations, des professeurs et des étudiant(e)s de l'université qui sont appelés à travailler avec des gens qui ont des limitations, du cégep et du centre de réadaptation. Il faudrait combiner. Pour que ce soit rentable, moi, je pense qu'il faudrait penser à quelque chose qui combine tout le monde."

d Meilleur accès: "Moi, ce que je rêverais, ça serait un laboratoire accessible (...) comme à la bibliothèque, un appareil, un laboratoire (...) OK, il faut avoir un contrôle, il faudrait peut-être qu'ils(elles) s'inscrivent ou qu'ils(elles) réservent, mais qui serait accessible 24, non pas 24 heures sur 24, mais disons de 8 heures le matin à 9 heures le soir."

Professor Question (6)

Quels autres sujets vous concernent dans ce domaine? Autre(s)

What other issues concern you in this area? Other(s)

6.1 Professor (Article 6.1) Quels autres sujets vous concernent dans ce domaine? / *What other issues concern you in this area?*

Professor Article 6.1.1 **Directing the students**

a. "Non, ça fait quelques années qu'on n'a pas, à ma connaissance, eu de contact avec des étudiant(e)s qui sont avec un problème de déficience fonctionnelle, parce que dans le collège ici, ces étudiant(e)s-là sont surtout orienté(e)s vers un programme qu'on appelle 'Accueil et Intégration'. Ce n'est pas un programme, c'est une activité qui se déroule, puis on a très peu de suivi après ça, savoir qu'est-ce qui se passe avec ces étudiant(e)s-là qui ont passé par ça (...) Je vais dire, cette porte d'entrée-là des étudiant(e)s qui ont des handicaps, ça fait quelques années qu'on en a pas. C'est un petit collège ici, mais, en sciences humaines, ça fait quelques années que, à ma connaissance, qu'on n'a pas d'étudiant(e)s qui ont des handicaps, manuels ou physiques."

Professor Article 6.1.2 **Current practices relative to computer use**

a. "Il y a comme une espèce de fascination sur tous les gadgets "up to date" qui sortent, mais qui sont de plus en plus complexes."

Professor Article 6.1.3 **Problems with computerization**

a. "Je suis tannée de "plug in". Là, les "plug in", ils me sortent par le nez de l'ordinateur."
b. "Parce que mes étudiant(e)s c'est aussi ça là qui les rebute là. Quand que juste pour être capable d'utiliser un logiciel qu'il faut que tu passes une heure juste pour comprendre le mode d'emploi là (...) ce n'est pas évident à utiliser, c'est rébarbatif à utiliser."

Professor Article 6.1.4 **Desire for a return to simplicity**

a. "Je rêve du temps, du moment où on va être rendu un peu plus raisonnable par rapport aux technologies puis les gens du milieu vont penser à des choses simples, que je n'ai pas besoin d'avoir deux pages de consignes pour être capable des l'utiliser. C'est complexe ça là, des choses simples, de revenir à la simplicité, à revenir aussi, l'objectif de ça, si j'utilise l'internet pour aller chercher de l'information."
b. "Je rêve du moment où l'environnement PC va être aussi stable que qu'est-ce que je vivais quand j'étais dans l'environnement Mac."

Professor Article 6.1.5 **New educational domain: students' and professors' relationship**

a. "A student who is not computer literate will not survive. Five to ten years ago, if you went into electrical engineering, you didn't have to know programming. Now if you don't know it you have a week to learn or else leave."
b. "Education has a social dimension, and we should remember what we talked about. We can't learn in a vacuum."
c. "As we struggle with technology, we become closer to our students."
d. "We as teachers don't have to be good at everything; this can help our teaching."

Professor Article 6.1.6 **Direct technological impact**

a. "Technology facilitates faculty exchange of information. It encourages (a) means to exchange ideas with colleagues."
b. "Use index cards instead of e-mail, that keeps you anonymous. Lots of ways to get (the) same result."

Professor Article 6.1.7 **Other issues**

Comments: These are issues that professors added that did not directly pertain to the questions.

Professor Article 6.1.7.1 **Use of networks**

a. "Non, c'est pour, c'est pour des recherches personnelles, pour du courrier, mais je n'ai pas encore utilisé ce genre d'exercice avec mes étudiant(e)s, donc je ne leur demande pas d'aller chercher sur internet autre chose que pour de la recherche. Et, ce que je fais par contre, c'est lorsque nous traitons de fichier, admettons que l'étudiant(e) a un produit sous forme de fichier, ben je demande de le déposer dans un répertoire, donc c'est toujours dans le réseau. Et c'est donc interne, ça ne fait pas appel à l'internet, pas encore."

Professor Article 6.1.7.2 **Problems with using computers in teaching**

a. Usage limité
   - "Il existe au collège, je pense, un appareil là où je pourrais utiliser les ordinateurs, mais c'est trop compliqué pour l'utiliser."
   - "C'est, c'est long tenir à date une page Web là, c'est quelque chose tenir ça à date tous les jours. C'est du sport là, tu sais. C'est un travail constant, et, c'est sûr que pour nous on considère que c'est tout du surplus qu'on fait. C'est comme un luxe qu'on se paye. On fait pour rendre ça encore plus intéressant, encore plus attrayant. Ce qui est difficile, c'est que c'est difficile d'arrêter. Puis en même temps, quand tu n'arrêtes pas, ça devient très exigeant au niveau du temps. Puis du temps que tu consacres à ça, ben c'est du temps que tu ne fais pas pour intervenir aux étudiant(e)s… il faut se méfier. On peut bouffer énormément d'énergie là-dedans. C'est un peu sans issue, mais c'est sans limites."

b. Accès difficile: "C'est qu'on n'est pas équipé (…) c'est très compliqué parce que cette salle multimédia est de plus en plus utilisée, c'est de plus en plus difficile d'avoir accès. Comme exemple, moi j'ai fait des démarches pour essayer d'avoir quelque chose par l'université (collège et université collaborent), étant donné qu'on est juste à côté de l'université, et je sais que l'université est beaucoup plus équipée que nous, et tous leurs appareils étaient déjà prêtés en informatique parce que les étudiant(e)s en informatique ont des projets à présenter aussi en fin de session, c'est ben à la mode les projets, et c'était réservé. Fait que je n'ai pas pu avoir accès. On a un problème à ce niveau-là. Je dois avouer là qu'au niveau de l'équipement informatique, on n'est pas up to date."

c. Problème de logiciel éducatif: "L'étudiant(e) n'achète pas le logiciel parce que c'est un logiciel qui n'est plus supporté, qui n'est plus vendu. Habituellement, les étudiant(e)s, ils(elles) se l'approprient d'une façon quelconque, mais ça cause plus ou moins de problèmes, parce que c'est un logiciel que ça fait sept, huit ans qui n'est plus supporté. Probablement qu'ils vont le chercher sur le réseau ou quelque chose comme ça (piratage). Mais nous autres, on n'a pas de moyen de contrer ça. Mais, c'est comme ça."

Professor Article 6.1.7.3 **Advantages of using computers in teaching**

a. Intérêt de l'utilisation des technologies par les étudiant(e)s
   - "C'est beaucoup de temps. Mais les résultats pour les étudiant(e)s, c'est très efficace, parce que j'ai unanimement des commentaires comme quoi ils ont adoré ça, ils ont trouvé ça intéressant, ils ont trouvé ça, au début, inquiétant et stressant, mais, moi, je dirais que 95% de mes étudiant(e)s maintenant utilisent le courrier électronique, pas seulement dans le cadre de mes cours, mais aussi pour communiquer pour des raisons personnelles. Ils(elles) ont découvert qu'il y avait plein de monde autour d'eux qui avaient eux aussi des courriers électroniques gratuits. Fait que, tous les étudiant(e)s ont beaucoup appris à ce niveau-là. Moi, je vais garder la même stratégie parce que c'est comme les obligations les obligent à le faire, puis après ils découvrent des avantages. J'ai des étudiant(e)s, moi je dirais que la moitié de la classe, c'est le seuil qu'ils ont atteint, l'autre moitié ont été plus loin."
   - "J'en vois beaucoup d'avantages. Moi je pense que ça ouvre beaucoup les étudiant(e)s à tout un autre univers. Ça ouvre les étudiant(e)s à voir au-delà de leur région. Ça les amène aussi de débloquer au niveau d'une langue seconde, puis même d'une troisième langue parce qu'au fond ils ont des outils qui leur permettent de se débloquer à ce

niveau-là. Puis les autres avantages (...) je te dirais au niveau de l'ouverture, au niveau de l'aspect critique aussi parce que si ce n'est pas juste de mettre des étudiant(e)s devant un appareil, c'est aussi d'arriver à critiquer ces nouveaux instruments-là, parce que c'est aussi un contenu idéologique très fort à l'intérieur et, si on le fait correctement, ça nous permet aussi de critiquer correctement ces outils-là."

b. Encouragement par l'enseignant:
  - "On les encourageait; il y en a plusieurs qui ont pris en même temps aussi un cours de traitement de texte en, en cours optionnel."
  - "Dans les éléments de motivation pour les étudiant(e)s, on prévoit mettre (les projets des étudiant(e)s) sur les pages Web du département parce qu'on a comme projet de mettre en place une page Web pour le département."

Professor Article 6.1.7.4 **Professors' views about teaching students with disabilities**

a. "Généralement les cours comme de méthodologie, les étudiant(e)s ont au moins fait une session, deux sessions déjà au cégep, alors si (...) il y a souvent des étudiant(e)s qui ont des difficultés, on les perd après la première session malheureusement."

b. "J'ai l'impression que je serais capable, en parlant avec l'étudiant(e), de m'adapter à ses besoins et d'essayer de trouver moyen de pourvoir lui permettre d'aller chercher tout ce qu'il(elle) peut aller chercher là. Mais, c'est un peu abstrait (...) Je ne le sais pas, il faudrait que je recherche ça là, je m'informerais, mais à première vue, je n'ai pas d'idée."

c. "Donc lui(elle), il(elle) suit le cours comme les autres étudiant(e)s. Détail technique, il(elle) a tendance à se placer plus à l'avant de la classe, c'est un peu moi qui lui ai demandé ça pour que, il y a des espèces de petits tests de 15 minutes au début des cours, à ce moment-là, il(elle) arrive, par exemple, si le cours débute à 8h30, il(elle) va arriver à 8h20, puis au lieu d'avoir seulement dix, douze minutes pour répondre à deux, trois questions, il(elle) va commencer cinq, six minutes avant, donc il(elle) a une copie d'un mini-test un peu avant. Donc c'est plus facile que s'il(elle) est complètement à l'autre extrémité de la classe. Donc c'est plus facile aussi de surveiller s'il(elle) a des questions spéciales ou des choses comme ça. Donc je l'ai comme placé dans la première ou deuxième rangée de la classe. Ça le(la) dérangeait pas, il(elle) était bien d'accord à ça, même, je pense de façon naturelle, il(elle) se serait placé(e) quand même assez près plutôt qu'à l'arrière de la classe."

d. "Moi c'est la première fois que j'ai un(e) étudiant(e) qui est identifié(e) en ayant un problème. Il ne semble pas que ça lui cause problème, donc je ne croirais pas, de ce qu'on fait ici, je ne croirais pas que ça cause des problèmes. Mais ça peut être différent par contre, je suis conscient(e) que ça pourrait être différent en fonction du programme où l'étudiant(e) est placé. Dans certains cas ça pourrait causer beaucoup plus de problèmes. Mais nous autres, l'interface est beaucoup au niveau du clavier, c'est certain que dans certains cas, ça peut limiter sa rapidité, donc ce qui fait que lui(elle) doit sûrement compenser en quelque part s'il(elle) veut suivre le groupe, c'est là que ça lui cause des problèmes. C'est lui(elle) qui fait le tampon, c'est lui(elle) qui fait qu'il(elle) peut réussir à suivre le groupe. Le travail, il y en a une grosse partie qui lui est retournée. Nous, on peut essayer de l'aider un peu pour cerner où est-ce qu'il(elle) n'a pas compris ou des choses comme ça, mais il reste que c'est lui(elle) qui, en bout de ligne, est obligé(e) de compenser par le temps. Je ne vois pas ce qu'il(elle) pourrait faire, c'est en lui(elle). Par exemple, c'est au niveau de l'ergonomie du clavier ou des choses comme ça, des éléments qui pourraient faire que ce soit plus facile pour lui(elle), les lettres plus espacées ou des choses comme ça ou, je ne vois pas de façon simple là. Lui(elle), dans son cas précis, le problème qu'on peut avoir, c'est que lui(elle), quand on donne deux heures, ben, à un groupe d'étudiant(e)s pour faire quelque chose, lui(elle), deux heures, ce n'est pas suffisant. Donc il faudrait être comme plus disponible pour lui(elle) en laboratoire. Avoir plus de temps pour lui(elle). Ce qui est physiquement pas possible à cause que, après deux heures, il y a un autre groupe d'étudiant(e)s qui entre avec un autre professeur. Donc, je ne sais pas moi, si c'est à 3h30 que ça finit, ben c'est fini à 3h30, il(elle) doit aller à ses cours ailleurs."

e. "Pour ce qui est chez-nous, lorsque nous tombons avec quelqu'un qui a des limitations, il y a un service, dépendant de c'est quoi la limitation, il peut y avoir le service d'une autre personne qui prend des notes, pour un(e) malentendant(e) admettons, il peut y avoir prise de notes. Et, j'ai vu, ce n'était pas dans ma classe, pendant toute la formation de trois ans, il y avait une personne qui faisait les signes. J'avais bien de l'admiration pour cette personne-là, parce que ça ne devait pas toujours être facile de faire les signes (dans un cours d'hydraulique), mais il(elle) a tout enseigné à l'étudiant(e). Puis à ma connaissance, il(elle) n'a pas eu de preneur(euse) de notes de cours, mais comme moi quand j'ai fait mes cours là, (dans d'autres cours) on pouvait prendre quelques centaines de pages de notes de cours, mais là ce n'est pas le cas du tout (dans mon cours). Mais s'il y a de quoi qui n'est pas clair, il(elle) peut venir nous voir aussi puis on peut complémenter ou il(elle) pourrait faire des photocopies des notes d'un(e) autre étudiant(e) qui a pris des notes de cours. Il(elle) a toujours accès à ça aussi. En général, il y a un bon climat d'entraide entre les étudiant(e)s."

f. "Moi je me sentais bien mal à l'aise de mettre des critères d'évaluation qui soient différents (pour l'étudiant(e) malentendant(e)) au niveau des fautes de français. J'essaie de ne pas le(la) pénaliser, mais (...) j'essaie d'appliquer aussi des critères qui fait que ça demeure équitable envers les autres. Parce qu'il faut faire attention aussi de ne pas se complaire à cause d'un handicap, donc je fais attention pour que ça demeure le plus possible équitable."

g. Au sujet des adaptations informatiques pour son étudiant(e): "Quand j'apprends un nouvel logiciel, j'utilise toujours les didacticiels de présentation ou toutes les informations qui sont dans, fournies avec le logiciel, fait que je savais qu'il y avait une fonctionnalité accessibilité. Fait que c'est pour ça que j'étais au courant qu'il existait quelque chose, puis après, j'ai tâtonné. J'ai fait des essais et erreurs, ça pas été évident parce qu'il y avait personne qui me le montrait, mais j'ai été capable, j'ai trouvé par moi-même."

Professor Article 6.1.7.5 **Training teaching staff**

a. "Et la frustration qu'on a (pour les cours) Performa, c'est, exemple, sur huit cours offerts, il y en a jamais plus que trois ou quatre qui sont donnés. Puis ça c'est fait en dehors, ça, c'est une des limites."

Professor Article 6.1.7.6 **Wish list and future**

a. "Plus d'équipement puis de l'équipement moderne."

b. "Coudonc, si l'école ne peut plus l'acheter, est-ce qu'on va l'exiger (l'ordinateur personnel) à nos étudiant(e)s? Et puis, je ne souhaiterais pas qu'on en vienne quand même un jour à ça, je souhaite quand même que les écoles fournissent l'équipement pour pouvoir travailler."

c. "Une chance que j'ai des collègues qui sont bien intéressés. C'est comme là cette année, j'ai un(e) collègue qui a suivi un cours sur l'utilisation de l'internet, puis là maintenant, il(elle) fait des choses que moi je ne fais pas. Il(elle) va me montrer ça cet été. Puis j'ai un(e) collègue qui va aller suivre un cours sur comment produire une page Web. Fait que ça à ce niveau-là, c'est, c'est motivant."

Discussion: Study 1

Conceptual Framework

One of the objectives of this study was to find out how systemic variables, such as provincial programs which provide computer and adaptive computer technologies to students with disabilities, interact with individual differences such as the nature of the student's disability. Because students are the direct recipients of computer technologies we use their responses as the basis for comparing and contrasting responses of personnel responsible for providing services to students with disabilities.

As noted in the Introduction section, we analyse the findings from the perspective of three conceptual frameworks. Fougeyrollas et al.'s (1999) PPH model (Processus de production du handicap / Disability Creation Process) is the primary analytical tool, although both the social model of disabilities (Oliver 1990, 1996) as well as the economic model (Bickenbach, 1993) are used. The models are described more comprehensively in the Introduction.

PPH model. This is widely used in Québec. It distinguishes between impairment and disability and explores a "situation de handicap" which result from the interaction between personal factors and environmental facilitators or obstacles (cf., Lemieux-Brassard, 1996). According to the model, the goal is full participation, which can only happen if a person is able to perform daily activities required for specific tasks. These include the ability to read, write, and understand according to social norms. In general, the PPH model focuses on individual rather than collective problem identification and solution (cf., Schneider, 2000).

Social model of disabilities. This model, too, distinguishes between impairment and disability but contends that disability is caused by lack of access for individuals with disabilities to resources available to nondisabled persons (cf., Oliver, 1990;1996). The model refers to disabling environments which result from unequal distribution of opportunities in society, including education and the means and tools to achieve it (Barnes 1996).

Economic model of disability. This model views disability, "primarily as a deficit in human capital that limits labor force participation and it proposes strategies for overcoming that deficit through individual enhancement" (Echenberg, 1997, p. 27). It is used to analyze the costs of disability and disability-related programs and can be used to evaluate how existing policies deal with economic issues related to disability (cf., Bickenbach, 1993; Echenberg, 1997).

Each of the three models used to analyse the data has a specific purpose. The PPH model addresses the individual's ability to perform daily activities according to set norms. According to Priestly's (1998) categorization of disability models, PPH would be considered an individual model and, therefore, unable to identify or explain systemic, social or political issues. Yet, the participants noted both social and political concerns. In contrast, the social model can be used to position problems within a systemic reality, assigning them a socio-political role. It does not however, account for specific impairment-related issues that were also raised by our participants. The economic model is used primarily to evaluate policy-related issues raised in Students Question 3 and Service Providers Question 4; these inquire about government subsidy programs and are economic in nature. The definitions of impairment and disability used are those proposed by the PPH model.

At the core of our research is the assumption that computer technologies are required tools in the educational system of the future. Students with disabilities need to have the opportunity to acquire the same technology-based literacy skills as their non-disabled peers. Therefore, students with disabilities need to learn how to use these. Thus, anything which hinders achieving this knowledge is an "obstacle" to full participation in society. Conversely, anything that makes achieving this knowledge easier is a "facilitator." When examining knowledge necessary to use computer technologies in the cegep system we determined the daily activities required for full participation. Then we identified obstacles described by students, personnel responsible for providing disability related services in the cegeps, as well as professors and compared these obstacles to the facilitators that these groups described or proposed. Finally, we make predictions about what could be effective facilitators.

"Situation de handicap dans la nouvelle société technologique d'éducation:" What Do The Participants Say?

Students' responses. In Student Question 1 we asked whether students use computer technologies and, if they do what kind of computer do they use and do they need any adaptations or modifications to use computers effectively. All participants were computer users. Therefore, the data provides information only about what computer users saw as obstacles and facilitators. Nevertheless, some of the obstacles mentioned might shed light on why some students do not use computers.

Equipment used. Students with disabilities use a wide range of hardware and software (see *Student Articles 1.1.1 and 1.1.2* in the Results section). Pentiums of all levels, IBMs, and IBM-compatibles were mentioned eleven times by students. Two students in the anglophone group also mentioned Macintosh computers (*Student Article 1.1.1,e*). Other students were less specific in responding to the question (*Student Article 1.1.2*). At least one student commented on the usefulness of his/her system: "I have a computer at home that was provided by the (designated rehabilitation center). It's a 386 and not powerful enough" (*Student Article 1.1.2,c*) demonstrating that some students have older computers; undoubtedly this will have an impact on the types of adaptations, which include self-made modifications or commercially available adaptive software or hardware, that the student can use.

Adaptations. Six students said that they had no need for adaptations to use a computer (*Student Article 1.2.1*). Of those who did have adaptations, some had well-known software such as name brands of screen enlargement software (*Student Article 1.2*). Adaptations such as these were mentioned most often by the eight students with visual impairments. One student mentioned using the chat facility of America On Line (AOL), which allows people using the same system to communicate without needing a TTD (Teletype Device for the Deaf). Others spoke of hardware. One of the most interesting points concerned the use of mainstream products as "adaptable" hardware or software. For example, although spelling and grammar checkers improve the quality of most students' work, for students with some types of learning disabilities and for students whose first language is not the one in which they are writing, such tools are used as "adaptive" technologies (*Student Article 1.2.3*). Some students, mainly those who are blind, mentioned using DOS programs.

Environmental obstacles and facilitators. Problems with ergonomic aspects of computer technologies and furniture in computer labs were noted by two students (*Student Article 1.2.4*). Generally, what students wanted were facilitators to the obstacles they perceived (*Student Article 1.2.6*). For example, one of the two "Deaf" students suggested a possible facilitator for the problem of speech on CD-ROMs and other speech-oriented computer technologies: "un petit médaillon avec un interprète, ça serait une idée." Francophone students appear to be aware of items that exist in the US in English: "Je sais qu'aux États-Unis, par exemple, ça existe un logiciel ou il y a un petit interprète dans le coin là. Mais la technologie n'est pas très bonne ou avancée." Other obstacles identified were high prices, limited government subsidy programs, lengthy delays before receiving computer technologies and support from government programs and agencies, and lack of choice.

Defining Daily Activities With Regard To Technologies And Education

Recent trends show that computer technologies have and will continue to be important tools both in education and employment (Lance, 2000; Ravandi, 2000). Therefore, having a certain level of mastery is necessary for students' daily activities. This issue was explored by individuals responsible for providing services to cegep students with disabilities as well as in Student Questions 1 and 4.

Cegeps generally obtain much of their on-campus equipment and funding through two central cegeps: Cégep du Vieux Montréal for the western part of Québec and Cégep de Sainte-Foy for the eastern half. Most of the individuals providing services to cegep students with disabilities said that they were happy with this mode of functioning.

Computer technologies on campus. Service providers told us about the equipment they have. This ranged from old technologies, such as a 286s and 486s, to laptops. Only one individual mentioned more sophisticated technologies, such as a Pentium 2 MMX.

There seem to be three situations regarding computer technologies for students with disabilities in the cegeps. Some service providers told us that they do not have any computer technologies on campus which are specifically dedicated for use by students with disabilities (*Service Provider Article 1.1*). Others told us that some students bring their own computers and use them at school (*Service Provider Article 1.12*). There seems to be a strong tendency among these individuals, primarily those from the outlying Regions, to say that computer related accommodations are made on a case by case basis. Both the students (Student Question 4) and service providers told us that equipment is either centralized in specific areas (*Service Provider Article 1.3.1*) or that it is decentralized in the cegeps' computer labs (*Service Provider Article 1.3.2*). We may speculate that this may be due to size of the cegep or the administrative regulations. It is difficult to identify whether centralization or decentralization is a facilitator. With respect to the role of other departments in the cegep, of those who answered a few said that some areas of the cegep, such as the library and the audio-visual department, house equipment for students with disabilities. There did not seem to be a consistent location for locating equipment. The recurring theme seems to be that regardless of cegep language or location, dealing with computer technologies for students with disabilities is not organized in a consistent way in all cegeps.

Obstacles and facilitators. There is considerable diversity among the cegeps in the availability of computer and adaptive computer technologies on campus. Service providers indicated that many of these technologies are primarily geared toward students with visual impairments. The role of these technologies as facilitators is clear not only for these students but also for students with other types of disabilities (Fichten, Barile, & Asuncion, 1999a). For example, technologies such as the "Kurzweil reading machine" may be used by students with other print impairments. Others tell us that they use Windows NT: "c'est du Windows de réseau" a network system that allows more than one computer and, subsequently, more than one student to access a particular program at the same time. An obstacle identified by both service providers and students was lack of compatibility with Windows NT systems and between different types of adaptive software.

Who assists. Service providers identified various groups which acted as facilitators by showing them and the students how to use equipment. Service providers generally indicated that they relied on support from computer technicians and identified technicians as the people who repair the computers (*Service Provider Article 1.4*). These technicians are either affiliated to the office for students with disabilities or are general computer technicians within the cegeps. Some service providers based in large cities told us that the central cegep with the loan banks (i.e., SAIDE or le Service aux étudiants handicapés du Cégep de Sainte-Foy) repair the equipment. Other said that the department where the equipment is located is responsible for getting the equipment repaired (i.e., library staff are responsible for arranging to repair equipment located in the library). Individuals responsible for providing services to cegep students with disabilities identified two groups that show students how to use the equipment; the service providers themselves, particularly in cegeps where there are fewer students and external agencies and programs, including rehabilitation centers. Participants also mentioned that some students enter cegeps with computer knowledge. Both service providers and students agree that training is not a systematic service offered by the office for students with disabilities or any other group.

A key difference between students and service providers lies in what the majority of students told us, i.e., that, for the most part, they learned how to use computers by themselves. Learning from service providers was mentioned less often by students than by service providers. This is consistent with the findings of one of our previous studies which, using a different population and different methodology, also showed that service providers also believed that they had a greater role in teaching students (Fichten, Barile, & Asuncion, 1999a). Another difference is that although both groups mentioned rehabilitation centers, students did so less frequently than service providers. Rehabilitation centers were sometimes identified by students as obstacles whereas service providers saw these as facilitators.

Where equipment comes from. Service providers understood and responded to the part of the question regarding "y a-t-il un programme de prêts" in two ways. Some responded in reference to the equipment loaned to the cegeps by the two centralized equipment loan banks: Cégep du Vieux Montréal and Cégep de Sainte-Foy. Others' responses reflected answers to the question of whether their cegeps loaned equipment to students for home use. Those who responded in regard to the centralized equipment loan bank were pleased with the service received. Thus, for them we can assume that the centralized equipment loan banks are facilitators (*Service Provider Article 1.6.1*).

In *Service Provider Article 1.6.3* we see that some cegeps also get equipment from other sources, including rehabilitation centers. Cegeps own some equipment themselves. Only a few participants actually said they did not loan equipment to students. Those service providers that loan equipment to students do so using equipment from the centralized equipment loan banks. It is not clear in some of the responses whether students may take the borrowed equipment off campus (e.g., laptop can be borrowed for classes to take notes and/or to take home to write assignments). Some service providers expressed concerns about loaning computer technologies to students especially for off campus use (*Service Provider Article 1.6.3,c,d*).

How well current practice in the cegeps works. If we examine the responses through the lens of the PPH model (Fougeyrollas 1996; Fougeyrollas et al., 1999), which emphasizes individual responses to problems, we must look at how obstacles for specific individuals turn into facilitators for those same individuals. For example, current practice allows service providers to assist a student with a visual impairment who is experiencing problems with a screen (obstacle) by providing screen magnification software, thus responding to that student's needs. If the identified problem is transformed into a facilitator, then this system works well.

Consistent with others' reports (e.g., Goodman 2000), students noted numerous facilitators and obstacles both in obtaining and using computers. A facilitator would be including people with disabilities during all stages of developing computer technologies. As suggested elsewhere, software should be developed to permit easy modification to allow for the addition of adaptive technologies. Of course, it would be best to develop technologies that have universally accessible features from the outset (Bergman et al., 1995).

Learning

Question 2, both for students and service providers, explored how these groups learn to use computer technologies, how well this works, and whether a different way of learning would be preferable.

Service providers. Most participants mentioned learning about computer and adaptive computer technologies on their own through hands-on trial-and-error methods. This is similar to students' reports. Some service providers said that they also learned through external professional courses. Service providers also noted other methods of learning not directly identified by students: informal exchanges with others, including other service providers. Several service providers also mentioned conferences and the internet.

Helping students. The majority of service providers indicated that they themselves do not assist students in learning to use computer technologies. Of the 14 participants in the Sainte-Foy focus groups, 2 did not respond directly to the question and 9 participants said "non." The following statement echoes the majority view: "Moi! Je n'assiste pas les étudiants dans l'utilisation des technologies informatiques." However, two did say "oui," and one specified "qu'il assiste les étudiants, qu'il agit au meilleur de ses connaissances, dans la mesure du possible" (*Student Article 2.1*). One of the 5 francophone service providers from Montréal area cegeps (*Student Article 2.1*) did not respond. One said: "Oui. C'est ça, c'est alors autant, les autres, les secrétaires, les agents de bureau et tout ça et les étudiants sourds et qui vont utiliser l'informatique. Aussitôt qu'ils sont en panne, ils viennent me retrouver." Three said "non" and added the following: "Alors, ce n'est pas le répondant local." Of the 5 service providers in the English focus group (*Student Article 2.1*), only 2 responded directly to this question. One said: "I am the primary person to assist students in using the technology." The other said: "Absolutely not, and if I did you'd be in big trouble." Others implied that they did some teaching at various levels.

Comparing how students and service providers learn. Generally, with respect to who teaches students how to use computers, service providers mentioned some of the same methods that students did: students learned on their own, took courses, or went to designated rehabilitation centers (*Student Article 2.5*). Indeed, students stated that they are primarily self-taught (19 of the 21 students stated they learned at least in part on their own (*Student Article 2.1.1*)), or received informal assistance from professors, family, friends (*Student Article 2.1.2*), etc. Some learned through the designated rehabilitation centers (primarily students with visual impairments (*Student Article 2.1.4*)). Some of these students however, had complaints about the training received: "At the (specialized rehabilitation center), they just teach the basics." A few other students took formal courses (*Student Article 2.1.3*),

Both service providers and students mentioned that students were generally self taught. The difference is in how often it is mentioned by both. For instance, service providers had a greater tendency to mention rehabilitation centers than the students (*Student Articles 2.1.4 and 2.5.3*). Ultimately, the responses of the two groups are similar, the major difference being one of rank ordering. For example, service providers, especially in francophone cegeps, mentioned technicians, whereas students did not do so (*Student Article 2.5.1*). One service provider emphasized that given the size of his/her cegep and the complex equipment, "a technician in our department" takes care of the equipment. Beyond that, the technician also needs to have the "ability to relate well to students with patience, understanding, support," and "the technical know-how, because that's the major part of the job."

When asked if the methods of learning worked well for the students, in large part service providers said that it did (*Service Provider Article 2.6*). Students, too, seemed relatively satisfied with their learning method, although some would have appreciated formal courses (*Student Article 2.2*). Service providers also reported learning primarily on their own, but most did not request formal courses. For the most part, service providers mentioned that technicians and students were helpful to them. According to students, their methods of learning appeared to be efficient, although a few said they only learned the basics and wanted or needed more practice. Two types of responses were heard. Students who had at least some minimal structured learning said that they were aware of the benefits of the training. Those who did not have any form of training indicated a desire for some structured learning experiences. Therefore, it appears that training courses of some kind are required. Thus, a course could be a facilitator. Although students in the city were the most vocal on this point, students in the regions also mentioned this. One student differentiated between the person who provided training and the quality and quantity of training itself: "I'm satisfied with the trainer but..." this student showed some reservation about the training itself. Although some students did not respond directly to the part of the question pertaining to other ways of learning, they did give specific suggestions on learning: courses, learning by oneself, start training earlier in school, personal trainer, books. One person said s/he was aware of the availability of courses but did not attend any: "Je sais qu'au (centre de réadaption) il y a des services qui sont offerts aux personnes sourdes. Par exemple on offre des formations à l'internet, des formations à tout ce qui est ordinateur, je n'ai jamais participé vraiment mais je sais que c'est offert." Some students specifically stated that they would like practical courses or suggestions (*Student Article 2.3.1*).

As did the students, some service providers also mentioned that formal training of some sort might be beneficial. Some of the methods mentioned included introductory courses in operating systems in addition to informal methods such as surfing the web, seeing what's out there, reading up on subjects, reading the manuals, trying to figure it out by trial-and-error, and asking technical staff at cegeps for assistance. One service provider mentioned an avenue that might have been helpful but was not: "I was very, very disappointed that the conference that was supposed to be held at one of the (rehabilitation) centers was cancelled on the weekend. I thought it would have been a great opportunity for me to just spend a lot of time with a lot of people that needed information, that needed to try it." Others emphasized that, in the final analysis, learning by oneself is the only option due to lack of time: "There's nobody that's going to do that for you, and certainly if you take a course like that it's on your own. It's very helpful, but I don't even have the time to do that. So I learn it on my own, I have a computer at home and I can bring it home, try it out." Technicians are featured in the responses of service providers. Some service providers received direct assistance from technicians, while others watched the technician and learned that way. By far the most popular response in all focus groups was that the service providers learned from the students (*Service Provider 2.5.2*).

Students. Students also spoke of other issues, including problems arising from lack of access or about the situation as it reflected their specific impairments. In other words, how technological barriers interfered with learning. For example, one student said that s/he had a "problème de dextérité des doigts donc était moins vite que les autres." A few students mentioned that technologies work well for them, whereas others said they had to adapt to the technologies: "(on) se débrouille." Some students mentioned that when they experience problems they ask for assistance and often get it: "Des fois il faut demander aux autres."

Obstacles and facilitators. Following the PPH model, facilitators for both students and service providers include acknowledging that each group learns differently, and that it is vital that students' knowledge of equipment be shared with service providers. Service providers mentioned other facilitators for them, such as attending conferences and using the internet. Perhaps this could also be a way for students to learn. Within this model we also see that students and service providers often learn how to use technologies by themselves. This is mentioned by both as facilitators. However, in Question 2 professors mentioned that they wished someone taught students to use the technologies. This suggests that professors did not view students as sufficiently skilled, implying that learning by oneself may not be a facilitator.

The social model of disability (cf., Oliver 1990,1996) suggests that lack of systematic training could be a problem for equal opportunity to education for students with disabilities. Indeed, mainstream computer technologies have to be learned by everyone in the cegeps. However, as was mentioned by students in the focus groups, computer facilities need to be accessible (*Student Article 1.2.4*). Some students found that the technologies were not adapted to their needs. This lack of access creates a "disabling environment" for students with disabilities who require adaptations. Whether they need commercially available or self-made adaptations and modifications, some students indicated that the present system is badly structured (*Student Article 6.2.6*). Therefore, students with disabilities, especially those who need adaptations to use a computer effectively, are at a disadvantage compared to nondisabled students. This lack of access requires extra time, money and effort on their part as long as we have a system that places the onus of the problems on the individual.

Potential impact. According to Goodman (2000), the strongest consensus among students with disabilities was that training was the most influential in helping them adapt to assistive and adaptive technologies. Would more training have an impact on students with disabilities in Québec? What impact would it have on personnel responsible for providing disability related services in the cegeps in their effort to assist students?

Subsidy Programs: Student Perspectives

One of our objectives was to find out about how systemic variables, including provincial subsidy programs, interact with individual variables and how these facilitate or impede the use of computer technologies by students with disabilities. Both Student Question 3 and Service Provider Question 4 deal with government subsidy programs for computer technologies for students with disabilities.

Purchasing. 12 of the 21 students stated that they bought at least one computer for home use by themselves or with assistance from family or friends. Only 6 students made use of government programs to obtain computer technologies. Some students also bought a second computer, or at least some of its parts, on their own. Four students said they bought the computers themselves, without assistance from anyone: "L'ordinateur que j'ai à la maison, c'est moi-même qui l'ai acheté" (*Student Article 3.1.2*). Others said they had assistance from family members or friends (*Student Article 3.1.1*).

Three students said that they had more than one computer. One indicated that one computer was paid for by a program, the other by a family member. For another, the second computer was paid for by a subsidy program. The third student said, "le deuxième, mon père l'a payé" (*Student Article 3.1.5*). Of the students who used subsidy programs, none were able to use them more than once: "I wanted more memory but the process was so complicated and long."

Different types of government programs. In Québec, the Programme d'allocation pour les besoins particuliers des étudiants atteints d'une déficience fonctionnelle majeure / Allowance for Special Needs is the major, although not the only program (Estey & Alphonse, 2000). Both designated programs, such as the Régie d'assurance maladie du Québec (RAMQ), and designated rehabilitation centers which assist people with specific types of impairments are involved in distributing computer and adaptive computer technologies. Several students complained about delays when assessing these sources: "I applied at the (designated rehabilitation center) for a laptop and it took a year" (*Student Article 3.4.1*).

Another avenue for students to obtain computer technologies is through subsidies from the ministère de l'éducation or the Office des personnes handicapées du Québec (OPHQ). At least 3 students indicated that their first computer was purchased with the assistance of subsidies. One frequently mentioned topic was that students often required a second computer or an update to their computers because the first was no longer appropriate for their needs or because it had broken down. The reality is that computers break down and become obsolete or that students' needs change, necessitating replacing or updating one's computer. This appeared to be a problem that these programs do not deal with: "I think they (the subsidy program) didn't want to pay for it" (*Student Article 3.6*). According to the PPH model this is a direct obstacle to the participation of students with disabilities in the education system.

As noted in *Student Article 3.4*, opinions by those who used the programs varied. A few participants said they found the programs satisfactory (a facilitator) or that they experienced no problems. One student explained that despite problems with the process, s/he found ways of getting what was needed: "Il(elle) a eu neurologue chez lui car il(elle) avait des contacts et avait le "cash" avant reçu celle du gouvernement. Il(elle) a agit au meilleur de ses connaissances et que le formulaire a été rempli par intervenante."

In Québec, students have access to different levels of government support. However, for a variety of reasons the majority did not use these. If we apply the PPH model, we need to ask what environmental obstacles students identify to explain this trend? *Student Article 3.3* and *3.4* show obstacles identified by students.

With regard to comments about subsidy programs, students made no distinctions between the computers they bring to school (portables) and those they use at home. Other students indicated that they were not aware of government programs (*Student Article 3.5.2*): "Puis ... si il y a des subventions qui existaient là, je suis, je ne suis pas au courant." These students were primarily from francophone cegeps.

Some students who did not use the government programs told us they felt they did not need these. Among those students who did not apply (*Student Article 3.5*), one expressed it as follows: "I find it works better getting it myself. Besides, you always feel that you've got it lent to you. It's not yours." For those who had less favorable opinions, difficulties identified involved both the process of applying as well as delays in notification of acceptance (*Student Article 3.5*). Students who used the program also identified the time factor as an obstacle. By the time students received the money or resources, the semester was over.

Others found the programs limiting because these only offered certain products. According to one student, these did not correspond to his/her real needs: "I was discouraged because the subsidy program chooses what I need. I have no say." In fact, some students found they had little choice in what they could get: "They're only available from (designated institution) and I wanted control over what computer I (get)." Students who did not use a program mentioned its restrictions as obstacles. These include limitations about what products can be obtained and limitations on updating or replacing the software and/or hardware. As can be seen in *Student Article 3.4.2.2*, some students who used a government program also mentioned that the technologies offered were not up-to-date. Delays between application and admittance to the program were mentioned by many students, not only in this specific question but also during the "free for all" period.

- Degree of impairment. Both students who used the government programs and those who did not mentioned that the eligibility criteria of several programs made it difficult for them to qualify (*Student Articles 3.4.2.1, and 3.5.1*). At least two students mentioned that according to the guidelines, they were not "handicapped enough" to qualify for subsidies. In fact, several subsidy programs have a specific degree of impairment to determine who qualifies. For example, for hearing impairment, 35 dB is the cut-off point.

- Parental income. Another problematic eligibility criterion concerned parents' finances. This was mentioned primarily by students who did not use the programs but also by some who had applied for subsidies. Both francophone and anglophone students in the cities as well as in the outlying regions mentioned this issue. As explained by one student, an adult student living with his/her parents due to the nature or requirements of their impairments has specific social realties that are not necessarily present in the lives of nondisabled persons. In terms of cost, this is consistent with analyses showing substantial levels of poverty among persons with disabilities (Fawcett, 1996; Gadza, 1994).

- Application process. Other problems identified by students who did not use government programs are categorized in *Student Articles 3.5.2 to 3.5.4*. Some of these are similar to problems identified by students who use subsidy programs. However, there were also specific obstacles identified by non-users. Students found the process and the forms complicated, even though some did apply: "C'était facile d'avoir l'ordinateur, mais il y a beaucoup de formalités."

Obstacles. In conclusion, primary environmental obstacles identified by students with regard to government programs are certain admissibility criteria which serve to disqualify students. This included parents' finances. Other obstacles were the exclusion of certain impairments from the list of "recognized disabilities," and criteria related to the degree of impairment. Lack of awareness about the existence of government programs is also an obstacle.

Subsidy Programs: Perspectives Of Individuals Responsible For Providing Services To Cegep Students With Disabilities

Awareness of government subsidy programs. When asked whether there were subsidy programs available for students to purchase or to borrow computer technologies 8 of the 13 participants who responded said they had limited or no knowledge of existing programs (*Service Provider Article 4.1.1*). Others (*Service Provider Articles 4.1.2 and 4.1.3*) said they refer students to the financial aid/loans and bursaries office. Others still stated that they are not directly responsible for helping students obtain computer technologies for off-campus use. In some cases, providing services to students with disabilities is only part of participants' jobs. In other cases, participants were new to the job. Therefore, it is not surprising to find the following responses: "This is an area where, maybe, I really don't know all the answers yet. I know that certainly the same financial aid programs are available to students with disabilities as to any other students, including computer loans. Whether or not there are specific programs for students with disabilities to receive financial aid is an area that I have not had an opportunity to look into yet." "Moi, les programmes de subventions, je ne les connaissais pas, je me serais référé ici pour les, les savoir, étant donné que je suis nouvelle ..."

Thus, overall, the service providers, like the students, seemed ill-informed about that which is available. City-based cegeps have larger numbers of students and, thus, greater access to information although this is not always up-to-date: "Right now, I learned a week and a month ago that I should be checking with the OPHQ. I have been told by an individual who seems knowledgeable. The OPHQ is making money available to students with disabilities via the CLSC." The lack of awareness can also be seen in responses listed in *Service Provider Article 4.2*. Some service providers indicate that they accept things as they are, while recognizing the imperfections. Others expressed satisfaction with equipment individual students received from the program.

Views about funding, loan and subsidy programs. A minority of participants were very well informed. They provided an overview of subsidy programs, both those associated with the government and those from private sources (*Service Provider Article 4.1.2*). One barrier identified by students and service providers was restrictive admissibility criteria (*Service Provider Article 4.2.4,f* and *Student Article 3.4.2.1*). Some service providers also believe that exclusion of students with certain impairments, specifically learning disabilities, is problematic. One service provider acknowledged that the way the case worker fills out letters and forms can have specific outcomes for students: "We had a student a couple of years ago who had fibromyalgia, and the OT (occupational therapist) wrote a strong enough letter and s/he got his/her computer" (*Service Provider Article 4.3.1,b*). Although service providers reiterated concerns about obstacles and barriers noted by students concerning restrictive eligibility criteria and failure of programs to replace or upgrade computers, fewer service providers than students expressed reservations about these programs. Service providers in cegeps with fewer students, primarily in the outlying regions, work "cas par cas" on an individualized basis, so their awareness of programs is specific to students whom they are serving. Most of those who work on a case-by-case basis seem to feel that if programs meet the individual needs of students, then the program must be satisfactory.

Obstacles. Last but not least, within the PPH model any obstacle to full participation is an environmental obstacle. Therefore, lacking information about programs is, in fact, an obstacle. This point is consistent with the social model, which would further imply that failure to recognize certain types or degrees of impairment is linked to the individualistic nature of the programs which place the onus of problem solving on the person. Similarly, using parental income as an eligibility criterion in the case of adult children disguises the fact that the system has an inherent inequity. Allowing for criteria that divide qualifying or deserving from non-qualifying (non-deserving) persons with disabilities is a form of discrimination in its own right.

Using the social model (Oliver 1990, 1996), the major relevant educational policy in Québec, the "Programme d'allocation pour les besoins particuliers des étudiants atteints d'une déficience fonctionnelle majeure - Allowance for Special Needs" is restrictive because it attempts to accommodate the physical impairment rather than to eliminate social barriers within the system itself. Second, there are several equity issues. Lack of information and awareness about government programs creates inequity because not all students can benefit from the programs in full. Moreover, students feel restricted by technologies that are not always suitable, whereas others choose to purchase technologies themselves rather than use the programs. Last but not least, restrictions about upgrading and up-dating computer technologies definitely place these students at a disadvantage.

Computers On Campus

To ascertain whether service providers were aware of the technical, environmental and attitudinal obstacles identified by the students, and whether they had any solutions/facilitators to suggest, we draw links between Service Provider Question 3 and Student Question 4.

Service providers: approaches to assisting students. Service providers tend to work on a case-by-case basis in the regions and in cegeps with few students with disabilities (*Service Provider Article 3.1.4*). This approach fits well within the PPH model, which looks at the individual approach to identifying barriers and finding facilitators or solutions and works primarily on a "one-on-one level" (cf., Fougeyrollas, 1996). This approach maintains that by addressing the individual's need, the market of services follows at the macro-system level. This suggests that even in cegeps with large numbers of students, service providers should be able to use the same case-by-case approach. Although, as we noted earlier, service providers referred to making on-campus equipment available to individual students as well as other ways of palliating these situations, no one claims that the "case-by-case" approach is an efficient way of functioning. This implies that in city cegeps where the numbers of students tend to be greater, the one-on-one approach is used less frequently.

Acquisition of technologies: funding and loans. Most service providers in both English and French cegeps explained or implied that the direct way that Québec cegeps receive funding for services to students with disabilities as well as equipment loans for on-campus use is through two central cegeps that serve as "centres d'accueuil" for students with disabilities: Cégep du Vieux Montréal for western Québec and Cégep de Sainte-Foy for eastern Québec. Service providers complete an individualized education plan (IEP/IIP) for each student who needs disability related services. These are sent to one of the two "centres d'accueuil" (*Service Provider Article 3.1*). Some service providers who responded to this question also discussed the "budget du collège" (*Service Provider Article 3.1.2*). Others informed us that students use their own equipment at the cegep (*Service Provider Article 3.1.3*).

Another central barrier identified only infrequently by students but very vocally by service provides was the trickle-down effect of recent financial cutbacks at the cegeps. These concerns can been seen in various parts of the Results section (*Service Provider Articles 3.2, 3.4 and Question 6*). Service providers told us that this problem is felt not only in individual cegeps, but also at the two central cegeps that house the equipment loan banks. Simply stated by one service provider: "(The) reality is that there's no money in the system." This is a topic discussed by all service provider participants in all focus groups, especially in the "free for all" discussion. In evaluating how well this system worked, the service providers identified money and other related realities as major problems (*Service Provider Article 3.2.1*). Most expressed general satisfaction with the centralized equipment loan program. Some, however, spoke extensively about difficulties. In cegeps with many students with disabilities, which often have a less individualized approach to services, service providers expressed more concerns about service provision and money. On the positive side, service providers in both the regions and the cities indicated that the equipment loan banks provided by the two central cegeps work well.

More time. Two main themes were evident. Service providers demonstrated their awareness that students have long waits for equipment. According to the PPH model, this can create "la situation d(e) handicap." Some service providers, primarily those in city cegeps which have large numbers of students with disabilities, expressed concern that they do not have as much time to learn about equipment or to provide services as they would like.

With regard to what does not work, service providers' answers identified lack of knowledge about technologies and resources (*Service Provider Article 3.4.1*). Not knowing about resources available to students with specific needs is particularly problematic when students do not have professionals external to the cegep following their progress. Funding cutbacks at the cegeps have made planning difficult for some service providers. In particular, special provisions for new technologies or new equipment that might be needed in future are difficult to make.

Obstacles and facilitators. From the PPH model perspective, the "formula of multiplying students' needs by the number of students" can be a facilitator. The larger numbers of students can be a facilitator because those with more money can reallocate funds. However, as a service provider from a smaller cegep pointed out, this formula can be an obstacle in cegeps with fewer students, as the formula adds up to less money for them. Nevertheless, there seemed to be general agreement that in cegeps where there are fewer students, when it comes to computer technologies on campus, the case-by-case approach works well. Within the PPH model, this way of working acts as a facilitator.

Service providers were generally aware of some of the problems identified by students. In the cases in which service providers work one-on-one with students, some of the obstacles may be dealt with for specific students at a given time. However, when addressing how well the system works for students and service providers, the same issues were identified. There was a concern about finances and service provision which were identified as obstacles by the service providers both in the cities and in the regions. Through the lens of the social model (Oliver, 1990;1996), this can be seen as a systemic rather than an individual cegep problem. Within the economic model (Echenberg, 1997), this obstacle may be resolved by a policy that takes into account the social deficit at a global level. That is, if students with disabilities do not have access to a proper education, they will not have the opportunity to be employed (Barnes, 1996; Fawcett, 1996; Gadacz, 1994), thus creating a social deficit. By investing in a system that acts as a facilitator for students, the service providers will reduce the risk of creating a social deficit.

The fast pace at which computers are evolving can either act as an obstacle or a facilitator for students with disabilities and for service providers. The outcome depends on whether the central barriers are turned into facilitators or if they continue to remain insurmountable obstacles. The fast pace could be a facilitator, if, as identified both by service providers and some students, companies that create adaptive and mainstream technologies work together to correct some of the problems (e.g., incompatibilities among products and other "bugs"). Service providers used a specific 'impairment' to illustrate how 'technological barriers' can become facilitators: "Comme une personne sourde, en anglais, à la maison, peut prendre du temps avec un appareil très fort pour qu'il puisse entendre. Il y a un moyen pour s'arranger..." Service providers also spoke of collaboration with others, with professors for example, to assist students in finding alternate ways of accommodating students' needs: "Il y a un étudiant qu'il faudrait adapter, mais on, on s'y ferait tout simplement."

Use Of Computers at the Cegeps

The use of computer technologies in the cegeps and how well these work for students are the topics noted in Student Question 4 and Service Provider Question 3. Some students used computers in a specialized setting, such as an office for students with disabilities (*Student Article 4.1.1*). Others bring their own equipment to school; this is most likely in the outlying regions (*Student Article 4.1.2 and* Service

Provider Question 3). Other students said they used computer equipment in decentralized areas, including libraries and the cegep's mainstream computer labs (*Student Article 4.1.3*).

Students. A number of students identified problems with the physical environment at school, ranging from unadapted furniture to problematic location of computers (Student Article 4.2). They also identified a number of technological problems. These ranged from inaccessible mice to other inaccessible aspects of hardware (Student Article 4.2.2). Organization of computer facilities at school was also seen as problematic by some students: the school did not have enough computers, nondisabled students occupied places reserved for students with disabilities, professors were not responsive in assisting students with disabilities. For example, one student reported that professors would not allow for accommodations such as extra lab time (Student Article 4.2.2.1,d). Only two students responded to the question about why they do not use computers at school. One said that s/he used sign language interpreters and that "using computers (is) difficult." Another indicated that using a computer at school slows him/her down. Some students said there was no problem *(Student Article 4.2.2.2)*. Among those who found computers helpful, some said it was faster to use a computer: "assez rapide sur ordinateur, plus que main et moins fatiguant." During the exchange in focus groups, some students wondered if they, too, might benefit from computers in some task that they had not thought of *(Student Article 4.4.2)*.

Obstacles and facilitators. By applying the notion of environmental facilitators and barriers we can easily see how a computer can be seen as a facilitator for specific tasks (e.g., writing) (*Student Article 4.2.2,g*). Other students however, saw the computer as a barrier to performing the same task (*Student Article 4.4.1*). Some students felt that using computers at home is easier than at school. These responses are consistent with the PPH model, which recognizes that a facilitator for one individual with a specific impairment may, in fact, be an obstacle for another person, even in cases of people with the same impairment. The assumption of this model is that the outcome is determined by the interaction between the individual with the impairment and all the elements of his/her environment. Although one cannot assume that all obstacles identified by students are systemic, students with similar impairments are likely to experience similar environmental obstacles. It is disturbing that more than twenty years after the publication of the major report on students with disabilities (cf., OPHQ, 1984; Leblanc, 1999) the same basic environmental problems prevail, creating obstacles for a new generation of students with disabilities in the educational system. More alarming is the fact that new technologies are also incorporating some of the same obstacles because of lack of access.

Students: What Works Well, What Works Poorly, And What Are Possible Solutions

Satisfaction. For the most part, students found that adaptations or "adaptable software/hardware" worked well (i.e., what the PPH model calls facilitators) *(Student Article 5.1.1)*. Two students in particular mentioned how mainstream software has built-in tools to allow students with visual impairments to adapt the software to facilitate the task *(Student Article 5.1.1,g,i)*. Others made mention of specific adapted software and hardware *(Student Article 5.1.1,a)*. Yet others mentioned general satisfaction with their computers.

Students mentioned that what works well was the service providers who work with them on a case-by-case basis *(Student Article 5.1.2)*. In particular, students from the regions, where cegeps have relatively few students with disabilities, appeared to be happy with this system of functioning. The case-by-case approach was identified as an "environmental facilitator" for students in these cegeps. It is difficult to determine whether this system would work well in cegeps with large numbers of students. As students from cegeps with large populations did not identify any specific facilitator, we can only hypothesize that if the case-by-case approach works well with few students, having more service providers at cegeps with large numbers of students may work effectively. On the other hand, large numbers may require a different system altogether.

Dissatisfaction. Students were equally vocal about the obstacles: technical problems, such as delays for computer repairs, unreliability of certain systems, problems with up-grades (*Student Article 5.21*), and disability-specific problems, such as lack of access to suitable computer technologies and mainstream software which lacks the tools to allow for adaptations (*Student Article 5.2.1,g*). Others referred to the problematic location of the on/off switch on monitors. Another group of obstacles related to problems learning. Students mentioned that software changes so quickly that they cannot keep up and that they had difficulty locating compatible adapted software (*Student Article 5.2.2*). They also noted a lack of resources to guide them to what is available (*Student Article 5.2.3*). Financial concerns are a recurring theme in various questions, both for service providers and students. In *Student Article 5.2.4* comments focused on the inability of subsidy programs to provide students with the software or hardware they need, necessitating having to pay for these oneself. One student noted that after waiting for assistance, students are often refused (*Student Article 5.2.4,a*).

Inclusion in development and decision making as a facilitator. Students identified some creative facilitators to problems (*Student Article 5.3*). For instance, they indicated wanting trial periods and access to books and manuals at "student discount" prices (*Student Article 5.3.1.2*). Specialized software mentioned by 'Deaf' students included speech-related technologies and voice dictation (*Student Article 5.3.1.2*). One student recommended that adaptive technologies keep up with mainstream upgrades (*Student Article 5.3.1.2,g*). People with disabilities need to be involved in the decision making process, from identifying their needs to having input concerning what equipment rehabilitation centers and government programs offer students. Other suggestions included improving the technology, offering specialized courses to teach people with disabilities to use computers, and laptop loans.

Service Providers: Future Developments in Computer Related Services

When service providers were asked what they would like to see in this area, they responded by both reiterating what they had already said and by raising new issues. A few said they could not foresee future developments (*Service Provider Article 5.1.1*). Some went back to the central recurring theme of finances (*Service Provider Article 5.1.2*). They wanted better subsidy programs for computer and adaptive computer technologies for both off-campus and on-campus use. Others (*Service Provider Article 5.1.2,b*) wanted to see more money invested in more comprehensive testing of students with learning disabilities. Three service providers spoke about the need for better training opportunities.

Uniformity in loans to students. A new issue raised by both anglophone and francophone service providers concerned equipment loans to students. Some participants identified existing loan programs, such as the one in British Columbia (*Service Provider Article 5.1.4,a*). A service provider noted that technologies and students' needs do not evolve at the same pace. Thus, a gap is created between needs and services (*Service Provider Article 5.1.4,d*). A suggestion was made to centralize a student loan program in the two cegep equipment loan banks (*Service Provider Article 5.1.4,f*). In contrast, others primarily in cegeps with fewer students, said that it would be difficult to establish a fixed procedure even when plans are made to respond to future needs, because last minute adaptations would have to be made (*Service Provider Article 5.1.4,b*). Moreover, with a fixed loan procedure individual needs would not necessarily be met. On the other hand, another service provider supported the idea of a uniform procedure for colleges and universities so that the transition would be easier for students. Service providers in cegeps with large numbers of students identified a loan program as a facilitator, as they seem to find barriers in the present system. On the other hand, service providers in cegeps with small numbers of students seemed happy with the present case-by-case system, which they identified as a facilitator for them. It is evident that service providers think that providing equipment and services to students must be organized according to the number of students in the cegep, rather than in a uniform way.

Keeping up-to-date with equipment and information. Service providers seemed very concerned about the fact that students do not get up-to-date equipment and that they have problems with updating equipment. Changes in the current system recommended by service providers (*Service Provider Article 5.1.5*) necessitates an analysis using the social model. This model would propose flexible policies that reflect changing social needs and are organized at the global rather than the individual level. As suggested in *Service Provider Article 5.1.5,c*, policy makers need to take the rapidly changing nature of computers into account. If students are to be part of the new knowledge-based society, they need access to the latest and most up-to-date tools.

Recurring themes were: information exchange regarding programs (*Service Provider Article 5.1.6*); information for students (*Service Provider Article 5.1.7*); and consulting (*Service Provider Article 5.1.8*). Service providers need access to recent, accurate information to help them respond to students' needs in a timely, well informed fashion. A network that functions as a safety net seems imperative for the proper functioning of this system. Their suggestions for facilitators ranged from one-to-one assistance to large information exchanges, consulting etc.

Advances in computer and adaptive computer technologies. When discussing new developments it was suggested that technologies that allow students who lip read to do so from a distance may be beneficial (*Service Provider Article 5.1.9*). The possibility of videoconferencing was also mentioned (*Service Provider Article 5.1.9,c*), though this is seen as still in its developing stages. Service providers said that students use computers and the internet at home. A service provider added that, for the most part, it is students with visual impairments who use computer technologies. With regard to internet use, one service provider expressed that students make very little use of the internet services at the college, because those who have it at home use it there. With regard to computer technologies, service providers noted that often the technologies used by students at home are out of date. This is also true of some of the equipment at the cegeps. Obsolete equipment is a barrier for both students and service providers. It is also a point of agreement between the two groups. In regard to the PPH model, one of the obstacles is the lack of consensus about what is needed. The determining factor in some areas is the number of students present in the cegep, reconfirming the idea that service providers need different systems based on the number of students.

Other Information

One goal of most non-traditional research, such as focus groups, is to allow for information sharing. This spontaneously occurred in all of our groups (*Student Article 5.3.2*). In accordance with Kruger (1994), unsolicited information volunteered by participants is considered important and must be treated as data that could lead to further investigation. Some of this information is presented below.

Computers as obstacles and facilitators. Among the issues of importance in the area of technology is that many francophone students felt that having a computer at home is important (Student Article 6.2.1). The students reiterated advantages of computer technologies indicating that these allow them to accomplish their academic daily activities more easily (e.g., word processing is faster and the work looks cleaner than writing by hand). In this case the computer is a facilitator. In contrast, some students pointed out that they write faster in shorthand. For them, the computer is not a facilitator (Student Article 6.2.4), once more demonstrating that the same environmental factor can be a facilitator for some students but an obstacle for others. Both service providers who purchase the technologies and students themselves need to be aware that the same computer technology does not necessarily affect people with special needs the same way, even when they have the same impairment.

In *Student Article 6.2.3* students make reference to disadvantages. For example, in *Student Article 6.2.3,a*, a 'Deaf' student expressed disability-specific disadvantages in regard to voice and speech based technologies. Students with visual impairments mentioned the problem of small print (*Student Article*

6.2.3,b). In *Student Article 6.2.10,d* the same 'Deaf' student suggested a solution - a facilitator according to the PPH model. Similarly, a student with a visual impairment found that the print enlargement option integrated in Windows 98 was a facilitator to assist with the problems of small print on the screen. Some students told us that their preference for one type of computer over another is due to the unreliability of certain software (*Student Article 1.1.2,d*). Most students failed to mention e-mail. Only one clearly identified not having e-mail. A few students had e-mail at home (*Student Article 6.2.5*), including a Hotmail account which is accessible from any terminal with internet access. None of the students said that they use e-mail to send assignments to professors or for any other academic purpose. One can make a hypothesis that at this time e-mail is not being used by students with impairments as a facilitator in pursuing their studies. Although students identified problems with transport and other forms of access, they do not yet see e-mail as a way to palliate their impairment. On the other hand, it may be that cegep professors are not yet heavy users of this method themselves. Only one of the professors whom we interviewed mentioned using e-mail as an integrated component in his/her course.

Kruger's (1994) focus group analysis offers an approach to new topics. One of these refers to both aspects of the PPH model. Students clearly identified environmental obstacles in relation to courses that are not adapted to their needs. They said that they feel at a disadvantage compared to the other (nondisabled) students (*Student Article 6.2.6*). One student illustrated how a facilitator can become an obstacle. For instance, in the case of a 'Deaf' student, "lors de l'interprétation peut, ça peut causer un problème." For a 'Deaf' student, the interpreter is supposed to be a facilitator. When the interpretation becomes an obstacle, the student is in "double jeopardy," first from the non-adapted classes and then from the very elements that are supposed to be acting as facilitators. Other students said that they feel they are lagging behind nondisabled students, because the courses are not adapted to their needs (*Student Article 6.2.6,a,b*).

Attitudes as obstacles. Another new issue raised was students' views about problematic attitudes of certain professionals toward them. These are also environmental obstacles (*Student Article 6.2.7*). Students also mentioned professors' discomfort and noted that they found certain professors unresponsive (*Student Article 6.2.7,a*). Such attitudes could be seen as "perceptual environmental obstacles" which erect barriers preventing full participation.

Whenever an environmental factor, such as a subsidy program which is intended as an environmental facilitator, is identified by its recipients as an environmental obstacle, it must be considered a barrier. Thus causes a state of double jeopardy for the students (Fine & Asch, 1981, 1988). Subsidy programs and rehabilitation centers were created with the intent of making life easier for students with disabilities (*Student Article 6.2.8*). However, students identified various obstacles created by the very institutions meant to serve them. An issue first raised in Question 3 and elaborated here concerns the fairness of considering parents' salary in subsidy programs (*Student Article 3.5.1,c*). Another problem with subsidies concerns bureaucratic requirements, which students identified as environmental obstacles (*Student Article 3.5.1,a*). Francophone and anglophone students from all regions of Québec stressed that rehabilitation programs were at best unaware of and at worst unresponsive to the their daily realities and technological needs (*Student Article 6.2.8*). Double jeopardy occurs because students who are supposed to be assisted by these rehabilitation centers and the subsidy programs actually have to struggle with them. Thus, according to the PPH model we can conclude that these obstacles interfere with the full participation of students with disabilities in the education system.

Overcoming old obstacles. Some students spoke about the physical environment as a problem (*Student Article 6.2.9*). Others addressed the issue by elaborating on problems with furniture, doors, chairs, and other specific design elements. Thus, in addition to "attitudinal environmental obstacles," students are dealing with architectural obstacles which were long ago identified as problematic in Québec (OPHQ, 1984; Dufour, 1992; Leblanc 1999). The wish list of students involves three factors: adaptation of the physical environment (*Student Article 6.2.10*), better software and better hardware.

Jobs of service providers. Service providers continued to identify barriers and facilitators during the open discussion session. Much of this centered on problems related to their own jobs and how these problems ultimately "trickle down" to students.

Personnel responsible for providing disability related services in the cegeps told us that they have multiple tasks. Some pointed out that they have other responsibilities in the cegeps (*Service Provider Article 6.3.5*). They also noted that their work load has increased. They provide hands-on teaching, especially to students who are newly diagnosed. They also act as resource people to assist with a variety of problems in addition to problems with computer technologies. They are responsible for information and referral as well as sensitizing students who may not be aware of what resources are available. They often refer students for testing if professors send them to the office for students with disabilities for assistance. Thus, they function as liaisons with faculty as well. Service providers are also contacted in emergencies (*Service Provider Article 6.3.5.3*). A service provider explained that the case-by-case system worked well, but that if s/he had more cases s/he would seek assistance from one of the centre d'accueuil central cegeps. This service provider stated that in cegeps with few students: "on n'a pas une vision globale du réseau, on a notre petit collège avec un ou deux handicapés qu'on connaît très bien, on peut leur répondre" (*Service Provider Article 6.3.5.3,b*). One service provider from a cegep with a large number of students noted that they proceed by crisis orientation rather than by prevention and education (*Service Provider Article 6.3.5.3,d*). Thus, the two obstacles identified by the service providers at cegeps with few students is that they lack a global perspective of the problems and, therefore, of the solutions. Because they work on a one-to-one basis, and are familiar with the unique problems of specific students, they lack the broad-based knowledge about available computer technologies. In the large cegeps, the main obstacle is the inability to assist individual students and the necessity to react to problems rather than prevent them.

Service providers told us that they get help from various sources. One service provider named a service provider from another institution. Service providers commented that sensitizing professors to the needs and concerns of students with disabilities is going well.

Service providers expressed various concerns about their own work. According to the PPH model, one of the obstacles faced by service providers is that they do not know from one year to the next how many students they will have and what adaptations will be needed (*Service Provider Article 6.3.6.11,a*). Service providers said that when they are informed, they can plan ahead - a facilitator (*Service Provider Article 6.3.5.5,a*). The inability to plan ahead is a clear barrier for service providers. Service providers also identified the following obstacles: lack of physical space (*Service Provider Article 6.3.6.11,a*); that the computer services are over-extended and it takes sustained amounts of time for technicians to respond to calls for assistance; and lack of time to devote to learning (a concern particularly noted in the English cegeps) (*Service Provider Article 6.3.6.11,b*). Service providers tended to be aware of the existence of newer and better technologies that could be helpful to students. However, the primary barrier tends to be financial. Awareness of newer and better technologies and lack of funding were mainly mentioned by anglophone service providers.

Equipment Vendors And Suppliers In Québec

Service providers indicated that in recent years vendors and suppliers of computer technologies have not promoted their products in the cegeps. This is in contrast to the past. This sheds light on possible reasons why service providers may not be particularly well informed about available equipment. It seems that suppliers' visits could be a facilitator for service providers.

Identification of disabilities. Service providers, primarily from the English cegeps, spoke about problems identifying "impairments/disabilities" (*Service Provider Article 6.3.5.12*). Learning disabilities are a primary concern, as can be seen throughout this section. With regard to learning disabilities, concerns tended to focused in two areas: identification of learning disabilities and students who had not mastered the dominant language in the cegep. However, this is not the only impairment that causes difficulties. In terms of identifying students, service providers have to take two considerations into account: getting a proper diagnosis to enable them to provide appropriate service and documenting the number of "eligible" students to ensure their funding (*Service Provider Question 4*). As did students in Question 3, service providers, too, noted that a central problem is the fact that some impairments are recognized for funding purposes whereas others are not. There is also an acknowledgement that not all students who could benefit from the disability related services provided by the cegep ask for this (*Service Provider Article 6.3.5.13.g to k*). Some service providers located the obstacles within the education system, because it does not provide proper diagnoses and because of the lack of remedial courses or assistance during the early schooling years.

Obstacles noted by personnel responsible for providing disability related services in the cegeps are individualistic within the PPH model's frame of reference. Four major obstacles exist: (1) lack of time and opportunity for service providers to carry out all of their tasks while learning about new developments in computer, learning and adaptive computer technologies; (2) service providers have multiple roles and lack the economic means to resolve problems; (3) funding is based on a formula which includes the number of students and the services provided; (4) there is a substantial clientele for whom funding is not provided. All of these factors create a "situation de handicap."

We can evaluate these obstacles from a social model perspective. As long as disabling environments exist, as long as policies are based on the notion that impairment is individual and, therefore, requires only individual solutions – as is implied by the educational policy which recognizes the existence of an impairment only if certain standards are met - the situation described above will continue. If the system by which service providers' tasks are assigned continue, the problem will persist. Only if and when the service providers' work is recognized as vital, in its entirety, will the students and personnel responsible for providing disability related services in the cegeps be able to benefit fully from the government programs and the educational system.

Use Of Computers By Professors

Three of the 7 francophone professors and 4 of the 7 anglophone ones had taught students with disabilities. The majority of professors used computers to prepare their course materials. Some used computers as teaching aids in class, in computer labs for simulations, and to communicate with students. The internet was also used to communicate with students and to obtain information, although it was not as extensively used as computers in general. Some professors rely on specific software for their courses (e.g., Sphynx) (*Professor Article 1.1.2*), while others use mainstream programs such as Excel (*Professor Article 1.1.1*). Echoed by the students, professors noted that students can work on computers in a laboratory and complete their class assignments either at home or after class when the laboratory is free (*Professor Article 1.3.4*).

The educational use of computers in the cegeps is still in its infancy, although professors seem interested in their potential. Some mentioned concerns about the technologies. They explained that it should be used only as a supplemental tool, that interaction with students is necessary, and that it may be hard to keep the attention of students on a computer projection on the wall (*Professor Article 1.3.3*). Concerns about interaction with students is consistent with Coombs and Banks' (2000, p.2) recommendations on distance learning for students with disabilities. Professors indicated that "technology (...) is the means to an end and not an end in itself. (...) Yes, using technology helps, but the focus must stay on the student." Therefore, technology should only be used as a supplemental tool to teaching and not a replacement of the professor in the classroom.

The resource person heavily involved in the integration of technologies in cegeps whom we interviewed, agrees that teachers need to redefine their teaching methods if they want to effectively integrate technologies into their teaching. S/he infers that with computer technologies, classrooms can be primarily used for exercises, consultation and simulations instead of traditional magisterial speech from the professor. Moreover, s/he notes that technologies also redefine students' ways of learning, since they now have to be more independent, relying less on the professor, and more on getting information on their own. S/he therefore suggests creating a learning community where students and teachers would collaborate in the transmission and construction of knowledge. For this to be possible, the professor must be inclined to use computers.

Many departments seem to have their own computer labs where professors teach most or part of their classes. Outside class hours, students can access these labs and complete their assignments (*Professor Article 1.3.4*). Our resource person, however, noticed that although the computer:student ratio was adequate, some departments may have greater access or more political leverage on what laboratory they can access. This results in unequal access to computers among disciplines and programs.

E-mail is favored by several professors. Some said that it allows the student to prepare questions for the following class. It also helps students develop social skills, as it "opens up the dialogue" between teachers and students and within the student community (*Professor Article 1.4.1,a*). Students are also asked to consult the internet to do research and access information, such as on-line data bases (*Professor Article 1.4.2, 1.5*). One professor predicted an increase in the use of the internet (*Professor Article 1.7*). It is difficult to ascertain whether the use of computer technologies in class is a facilitator for students, since participants gave conflicting answers. However, computers seem to help communication between student and teacher. As one professor noted, "(E-mail) improves communication because e-mail provides a new way to answer students' questions" (*Professor Article 1.4.1,d*).

Teaching students with disabilities using computer technologies. Half of the participating professors had the opportunity to teach students with various disabilities (*Professor Article 2.1*). According to professors, few of these students used specific or adapted computer technologies because they did not need any or they managed otherwise (e.g., a personal assistant, extra time for exams, documents given before class) (*Professor Article 2.2.1, 2.2.2*). However, it is important to note that, "students with disabilities often fear rejection by a professor when requesting special help." Just because there were no requests for accommodations does not mean that students do not need any. Professors should therefore "convey the message" that they are available to help (Coombs & Banks, 2000, p.5).

Those who had had students with disabilities in their courses had been able to adapt their courses with or without technologies. Some relied on an office for students with disabilities for assistance (*Professor Article 2.4.1*). If adaptations were made, these mostly concerned modifications to the physical environment. However, professors acknowledged that computers and the internet could be helpful for their students (*Professor Article 2.5.2*). Therefore, in this context, computers can be seen as facilitators according to the PPH model. Nevertheless, access to computers is limited. For example, some students do not meet government program criteria for subsidized computer technologies (*Professor Article 2.1*). In fact, some professors explicitly mentioned that computer technologies can be helpful to students with disabilities (*Professor Article 2.5.2*) but only if they can have access to these (*Professor Article 2.6*).

Specific equipment is used in class or labs by students with disabilities, such as a portable computer or a Braille display. These often belong to the students themselves. In some cases, the professor used the built-in accessibility features of popular software packages (*Professor Article 2.2.1*). Some professors who had not taught students with impairments expressed concerns about being unprepared to teach students with special needs (*Professor Article 2.4.2*). But, professors "learn a lot from students" on how to accommodate them (*Professor Article 2.4.3*). To this effect, Coombs and Banks (2000, p. 4) suggest making a team project with students and staff to help overcome the inaccessibility of computer technologies. They also propose that professors, "try to grasp the way (their) materials are being accessed" by students with disabilities to better accommodate them. Lack of knowledge and training for students, service providers, and professors can be an obstacle to full access to computers for students. According to the PPH model this creates a "situation de handicap." As with the service providers, some professors acknowledged the benefits of better organization when having students with disabilities in their class. Better organization operates as a facilitator for all concerned. If service providers and professors are better organized, their work is facilitated. This ultimately benefits the students.

Future developments in teaching using computer technologies. Professors foresaw an increase in the use of computer technologies in their teaching and positive developments in the quality of equipment (e.g., better performance, easier interface with voice recognition), lower prices, and increased availability of specific pedagogical tools: "Ben c'est certain qu'il peut y avoir de mise sur le marché certaine forme de didacticiels qui vont peut-être aider à l'apprentissage de certains concepts" *(Professor Article 3.2.1,i)*.

Some professors outlined concerns about pedagogy and institutional realities: their own and students' lack of computer knowledge and training and insufficient technical support (*Professor Article 3.2.1*). According to Coombs and Banks (2000, p.2), "the teacher has to know something about the technology to use it effectively." This lack of knowledge creates an obstacle to effective use of computer technologies in education.

Professors also expressed concerns about integrating computer components in class, changes required in teaching methods, and the disinclination of teachers and students to use computers (*Professor Article 3.2.3*). The resource person we interviewed also mentioned that teachers fear using computers in class: computers demand that the professor redefine her/his teaching method because the students now have access to more information and can discuss this with the professor. Furthermore, teachers who are interested in using computers in their classes, which seems to be the case in our sample, can sometimes encounter unfortunate situations where the equipment or the network crashes, wrecking planned class activities. According to the resource person, networks in many cegeps are unstable and some professors have come to fear this. To fully integrate technologies in the learning process, s/he therefore suggests consolidating and standardizing networks. Professors also expressed concerns about the unreliability of obsolete equipment and lack of money (*Professor Articles 3.2.4 and 3.2.6*). Economic factors, such as lack of resources – both financial and human - can be seen as an obstacle that leads to unequal access to education.

According to one professor, computers are increasingly being integrated into teaching (*Professor Article 3.1.2*). In contrast, it was observed that, at this time, some components of the educational system's computers do not meet the needs of students with disabilities. There appears to be no plan for increasing accessibility. The lack of equipment, personnel, and training diminishes the use of computers by students with disabilities, hindering their academic success. Ultimately, this creates a disabling environment at the collective level. These obstacles place individual students in a "situation de handicap" (Fougeyrollas, 1996). The subject of time was also mentioned as an obstacle to the use of computers. Professors lack time to learn how to use computer technologies and to assist students with disabilities. According to professors, the scheduled training courses are not adequate for students either (*Professor Article 3.3.2 and 3.3.3*).

Possible solutions or facilitators that would increase the use of computers in class include reducing the number of students per class and providing students both with and without disabilities their own equipment. These suggestions imply that all students must have equal access to computers. This, currently, is not the situation in the cegeps (*Professor Article 3.2.5*). For example, some students can afford their own computers whereas others only have access in the school's lab. Even among those who have computers, not all have the same brand and speed of computers. Students with disabilities have additional constraints. Another solution is for professors to learn to use computers so that they can teach students (*Professor Article 3.2.5,b*). But, as mentioned previously, professors lack the support to learn how to use specific equipment or software.

Availability of resources and training. Although training to assist professors in integrating computer technologies into their classes is available, some professors are not aware of this. Other problems mentioned by professors refer to lack of resources (*Professor Article 4.3*). Professors noted both positive and negative points. The main issues concerned professors' methods of learning how to use computers and institutional support for this process.

When it comes to learning, professors have to be autonomous (*Professor Article 4.1.1*). This seems to reflect the situation in most cegeps, since our resource person, too, noted it. S/he explained that in order to integrate computer components in class, professors are on their own. This requires a lot of time and effort on their part. However, colleges do offer courses and seminars (e.g., Performa). These are usually paid for by the college in collaboration with other institutions (*Professor Article 4.1.2* and *4.2*). In these courses, professors have the opportunity to learn how to use the internet, how to integrate computers into their courses, and how to use specific programs and hardware (*Professor Article 4.2*).

To assist professors who use computers in their courses to accommodate the needs of students with disabilities computer technicians and the office for students with disabilities make support available to both teachers and students (*Professor Article 4.1.3*). Professors, however, report that these individuals lack time and expertise, especially when it comes to assisting with adaptive computer technologies (*Professor Article 4.1.3*). Accommodations for students are generally made on a case-by-case basis (*Professor Article 5.1.3*). According to the economic model, when human capital is available, but in an insufficient amount, this creates obstacles which place individual students in a "situation de handicap" (Fougeyrollas, 1996). According to the social model, this creates a disabling environment on a collective level which prevents the full use of computers in the academic milieu. Skimpy resources, lack of personnel, and "experts" without expertise reduce the ability to use computers as facilitators and prevent them from diminishing inequity in the present educational system. The system does not meet the needs of students with disabilities, thereby hindering their academic success and their chances of becoming more employable.

Solutions suggested by professors which could function as facilitators for them are: more personnel to teach them how to use computer technologies more effectively; more money for training and materials, and more money to buy equipment for students with disabilities (*Professor Article 4.3.1* to *4.3.4*). These suggestions concur with our resource person's assessment of the situation. S/he, too, signaled the lack of personnel and money. To allow a better integration of technologies in teaching, greater knowledge and additional time to learn are needed.

Evaluation of the system: What works well and what does not. Professors seemed to see the computer as a facilitator. But the support and organization needed to implement the full use of computers in the delivery of education are unsatisfactory. Three professors identified the cost of technologies as a problem. One noted that beyond financial concerns, there are also attitudinal problems both toward computers and toward students with disabilities. Some professors are only just starting to use overhead projectors, and they cannot afford computers.

According to professors, computer technologies can be facilitators to the learning process. The resource person we interviewed added that computers allow professors and students to create innovative projects. More precisely, computer technologies give students the opportunity to develop independence, initiative, critical thinking, openness and creativity (*Professor Article 5.1.1*). These qualities, according to our resource person, are essential in the work environment. Computers also permit distributed learning and individualized teaching that allow students to learn either at home or at school at their own pace. Skills acquired through the use of computer technologies can also assist students in the job market *(Professor Article 5.1.1)*.

Computers permit professors to create simulations in class (*Professor Article 5.1.2*). Some respondents described computers as "outils merveilleux" (*Professor Article 5.1.2,b*) and noted that they "are good to make science a living thing" (*Professor Article 5.1.2,c*). With the internet, students can prepare questions for class since they have access to information. The technology allows students to show the professor that they have assimilated the material. Through e-mail, some professors where able to communicate with students. For example, they could have "virtual meetings" with students and keep the communication anonymous (*Professor Article 5.1.2,a*). What seems to work well for professors is availability of computers and a network that is reliable (*Professor Article 5.1.4*). One professor mentioned that it can be helpful for students with disabilities to bring their own equipment to class (e.g., a laptop) (*Professor Article 5.1.3*).

Professors seems to view computers as a facilitator in teaching students in general, including students with disabilities. However, some obstacles limit the full use of these as pedagogical tools. For example, one professor explained that since the support from administration is insufficient, faculty have to experiment with the integration of a computer component into their courses. This is time and energy-consuming for them (*Professor Article 5.2.1*). Professors also mentioned that the inadequate performance of some of the available equipment prevents them from using computers to their full capacity (*Professor Article 5.2.2*).

Our resource person explained that there are two approaches to acquiring computers in colleges. One is that the institution will buy a brand name computer, which will be more expensive but require less maintenance. The second is to buy cheaper models that can last for about 3 years but may need replacement much sooner. Although cegeps' computers have recently been upgraded, so that now about 60% of them are Pentiums, this second approach to computer purchases may explain the recurrent mention of problematic experiences with computers by professors. Teachers also pointed out that preparation takes a great deal of time when using computer components in class (*Professor Article 5.2.1*). Some noted that they lack knowledge; this restricts them to simpler use of computers. A professor mentioned that computers should be used as a learning tool only. Other problems mentioned by professors concern maintenance of web sites, difficulty updating or even recycling the equipment, and trouble communicating with different colleges due to incompatibility (*Professor Article 5.2*). To be effective as a teaching tool, computers require changes in teaching methods, including fewer students and more individualized teaching (*Professor Article 5.2.4,b*). A professor explained that there may be problems because a proportion of students would not be able to become autonomous learners (*Professor Article 5.2.4,c*). Professors also mentioned a need for internal support. Some noted that they lacked assistance from the college's computer technicians. The lack of a global perspective on the integration of computers into the curriculum was also identified. For the present, everything is done "à la pièce" (*Professor Article 5.4.1* and *5.4.2*). This "patching" was also mentioned by our resource person. This approach to integration of computers may explain some frustrations since computers, consequently, frequently crash.

A professor expressed concern that computer equipment used by students with disabilities is expensive and will be out of date by the time they finish college, when they will have to pay for additional equipment. Another professor mentioned that students may be afraid of computers (*Professor Article 5.3.2*). According to a professor, one of the "handicaps" for students - relating to the social model's disabling environment concept - is unequal access to the internet and to powerful computers or, indeed, computers in general (*Professor Article 5.4.2,b*).

Problems with information available on the internet noted by professors include plagiarism and the lack of a critical attitude towards materials available on the net (*Professor Article 5.4.3*). This is the flip side of the belief that the internet is a good pedagogical tool.

Many professors identified possible solutions (facilitators according to the PPH model) - money and human capital (according to the economic model) - to the previously mentioned problems (*Professor Articles 5.5 and 5.6*). Some mentioned that more people, such as instructional designers and computer support personnel, should be assigned to work on the integration of computers into the academic system. Some wished for more and better computers and better access to computer laboratories for students. Finally, certain professors wanted fewer students and more time to access information.

Other concerns about teaching using computer technologies. One professor wanted to return to a simpler experience with computers: more reliability, like a MAC for example. Another was tired of "plug-ins" (*Professor Article 6.1.3*). Although students now need to be computer literate to pursue their studies (*Professor Article 6.1.5*), the time it takes to learn how to use computers can be an obstacle for them. Although computers are more and more complex, according to one professor, there seems to be a fascination with computer technologies. One mentioned: "As we struggle with technology, we become closer to our students." However, the 'social dimension' of education needs to be maintained: " We can't learn in a vacuum" (*Professor Article 6.1.5,b*). This comment concurs with Coombs and Banks' (2000, p.2) warning and recommendation: "When teachers first take the plunge into distance learning, they feel most secure replicating what they do in the classroom." They should, instead, adapt their teaching to this new tool, which can, for example, facilitate interaction - an important component in teaching. Positive aspects noted by professors are that computers can help with teaching and that they "facilitate faculty exchange of information. It encourages means to exchange ideas with colleagues" (*Professor Article 6.6*). Collaboration between departments and colleges was also mentioned by our resource person as a solution to a fuller integration of computers into teaching at the postsecondary level.

Other issues mentioned by professors concerned the personal use of computers for e-mail. One respondent also mentioned that s/he asked students to put their work on the server, although this professor does not use e-mail with the students (*Professor Article 6.1.7.1*). Some professors reiterated their concerns about the complexity of computers and about the time required to update web pages. One noted that a web page is a luxury. Professors need time to make their material more interesting: "Puis du temps que tu consacres à ça, ben c'est du temps que tu ne fais pas pour intervenir aux étudiants (...) il faut se méfier. On peut bouffer énormément d'énergie là-dedans. C'est un peu sans issue, mais c'est sans limite" (*Professor Article 6.1.7.2,a*). The professors also outlined the lack of powerful equipment and the difficulty of obtaining this. As for software, the company no longer provides support. Some of the students had to "pirater" (unauthorized copy) the software for them to be able to access it (*Professor Article 6.1.7.2,c*).

Professors also see advantages in integrating computer components into their courses. Although at first students found using computers for class assignments stressful and alarming, they learned to enjoy them and became interested in using them (*Professor Article 6.1.7.3*). Professors find that, in general, computer technologies help students discover new worlds and compels them to be critical towards new information. For francophone students computer technologies require that they learn a second language (*Professor Article 6.1.7.3,a*). According to one professor, computers work as a motivator (*Professor Article 6.1.7.3,b*).

As for students with disabilities, some professors believe that students who have difficulties in school, such as students with disabilities, do not return the next semester (*Professor Article 6.1.7.4,a*). Other professors mentioned that they would try to accommodate students by asking them what they need, by getting informed, by sitting the student in the front row and making sure they understood, or by using the integrated accessibility applications of software. For one professor, a student with a disability in a class did not have trouble following the course. If that student had needed more lab time (due to being a slower typist), the professor believes the student would have managed on her/his own (*Professor Article 6.1.7.4*). Other non-technical accommodations mentioned were assistants in class: note-takers and interpreters. As a general comment, some professors wanted students to be better equipped, while others did not want students to buy their own equipment since they believed purchasing equipment is the cegep's responsibility (*Professor Article 6.1.7.6,b*). Finally, a professor mentioned being uncomfortable applying different criteria to students with disabilities because s/he felt it would penalize the others (*Professor Article 6.1.7.4,f*).

If we combine the social model's assumptions with the understanding that society is inherently unequal for people with disabilities, we can see the reason for the general lack of accessibility. A student with a disability enters a disabling educational system (Oliver & Zarb, 1989; Swain, Finkelstein, French, & Oliver, 1996). The social model is based on the notion of "reasonable accommodations" (Goundry, 1993) which support students' opportunity to succeed (Boyer, 1985). Equality does not necessarily mean the same treatment. The same treatment does not necessarily mean equal treatment. For example, giving a student who is a slow typist because of a disability the same amount of time as a nondisabled student (i.e., identical treatment) does not grant the two students equal treatment. More time for the slow typist does. The decision in Huck vs. Odeon Theatres applied the notion of diversity (Boyer, 1985). However, providing extra time for students with disabilities does not take away from other students. Rather, it is simply accommodating students with disabilities by creating a facilitator that would remove the "situation de handicap." It is also important to note that even within the population of students with disabilities, the notion of diversity needs to be respected. As mentioned by the PPH model, a facilitator for one student with a specific impairment does not necessarily act as a facilitator for all students with impairments or even for individuals with the same impairment.

Conclusions

The method of analysis conducted using the PPH model (Fougeyrollas, 1996; Fougeyrollas et al., 1999, Schneider, 2000) is individualistic in nature. It looks at specific obstacles and attempts to find what facilitators work best in a given situation for an individual at a given time. Some personnel responsible for providing disability related services in the cegeps and most students told us the case-by-case system is satisfactory, at least for the present, in cegeps where there are few students with disabilities. In these cases the PPH model is effective and appropriate in helping uncover and understand the individual aspects of particular situations and, thus, provide the needed case-by-case solutions.

Since all system-based problems have individual consequences, the individual realities must be identified (Barile, 1993). Here, system-based refers to all organizations that deal with cegep education. Thus, system-based problems refer to problems that arise within these organizations that may have systemic effects on students with impairments. In this regard, students and personnel responsible for providing disability related services in the cegeps identified system-based obstacles, such as the shortcomings of equipment subsidy and funding programs, lack of funding, and ways by which impairments are identified. All of these shortcomings are systemic and require system-based solutions. These are not usually included in individualist models such as the PPH model.

To best explain such problems and to propose solutions we turn to Oliver's (1990,1996) social model of disabilities and to the economic model (Bickenbach 1993; Echenberg, 1997; Hahn 1985). The social model's premise is that problems that affect large numbers of people are social in nature and are inherent in the socio-political system which controls the way policies are presented and administered (Oliver 1990). The present educational policy in Québec is the "Programme allocation pour les besoins particuliers des étudiants atteints d'une déficience fonctionnelle majeure / Allowance for Special Needs." This program is based on a definition of impairment, disabilities, and handicap which emanates from the International Classification of Handicaps Impairments and Disabilities (ICHID) (World Health Organization (WHO), 1980). This definition allows some impairments to be more easily classified than others and allows policy makers to automatically exclude instances that do not fit in their set categories. As can be demonstrated by the social model, the Québec policy is inherently unequal because it is based on social conditions that are set within a system that excludes rather than includes.

Any new policy should take into account the requirements for a system that encourages equal inclusion in education and provides the tools to achieve this. This could range from universally accessible technologies to the understanding that as technologies change, so do the needs of the collective and the individual (Bergman, et al., 1999). This new policy would, thus, facilitate computer technology loan programs to students, such as the one mentioned by service providers, or the renewal of students' old technologies. Likewise, if the economic model of disability would force examination of global questions, such ways could "reduce the social cost of disability by increasing the employability of people with disabilities" (Bickenbach 1993).

It can be assumed that in today's technological society, which is grounded in a knowledge-based economy, having a better education and knowledge of and access to computer technologies will lead to better employment opportunities for all, including people with disabilities. This is consistent with the economic model. To be eligible for the "Programme allocation pour les besoins particuliers des étudiants atteints d'une déficience fonctionnelle majeure / Allowance for Special Needs," the student and/or his family must prove need. This is not a universal program available to all regardless of income, despite the fact that education is supposed to be central to the economic growth of industrialized nations. In particular, applying parental income criteria to adult children with disabilities who live with their parents for a variety of reasons, including physical necessity and lengthy times spent in school, is inappropriate. The economic model also recognizes "social deficit" - a shortcoming within the present economic structure. To overcome the social deficit, one needs to use the criteria of rights-based analysis, which takes into account historical inequity (Barnes, 1996; Oliver, 1999). By examining the social context, one can establish that the primary cause of discrimination rests in the social structure (Goundry & Peters, 1994) or in the distribution of material goods, in this case, accessible computer technologies. Within this frame of reference, "reasonable accommodation" - a reasonable effort to accommodate the individual who otherwise would be subject to discrimination (Peters, 1987) - must be used to correct social deficit.

The Programme allocation pour les besoins particuliers des étudiants atteints d'une déficience fonctionnelle majeure / Allowance for Special Needs includes a provision for forgiving loans by treating them as bursaries. These bursaries aim at correcting environmental barriers to education by providing some of the required technical support. This is consistent with the spirit of the economic model, which also shows us that financial need was a central criterion in this program. The program recognizes that a disabling economic market will limit students with impairments in finding employment to a greater extent than their nondisabled peers, and that costs related to their impairments take up a large portion of their income. It must be considered that students with disabilities have material needs. Some of these are disability-related, requiring income that covers living expenses incurred during the academic year (e.g., hearing aid batteries, food, rent, textbooks, etc.).

Using either the economic or the social model to review student and service provider participants' responses identifies problems with computer technologies for students with disabilities as operating within the system rather than within the individuals. Solutions based on these models include eliminating those parts of subsidy programs that take into account a limited definition of impairments. Therefore, the degree of hearing loss would not be a determinant, nor would visual impairments rank more highly than learning disabilities. It is implicit in these models, particularly within the social model, that the education system itself is deficient in meeting the needs of people with specific characteristics. Therefore, the education system must either change to create a less deficient system or accommodate to allow equal access to all who express need.

Shared views. Students, service providers and professors had diverse perspectives about the current use of computers by students with disabilities in the cegeps. However, they agreed on some aspects of what is used and what is needed, what works well or does not work well about government subsidy programs and organizations that support the learning process. Data from Study 1 shows that both students and professors use computers at school, mostly in mainstream computer labs. According to students with disabilities and service providers, students use different brands of computers and, occasionally, outdated models. Computers seem useful for students, according to both students and professors, for academic purposes such as class assignments. The internet is another tool commonly used in course work. Some students also work on computers in their homes. Professors and students mentioned that students rarely use adaptations for their computers. Some students said they do not need any adaptations, others were unaware that adaptations are possible, and yet others managed to create their own adaptations. Some students use accessibility features built into mainstream software and hardware, while others use "adaptive equipment" designed to accommodate their disability.

The findings highlight the lack of specialized technical support and knowledge that was mentioned by all three groups. Although service providers and professors received support from technicians, and though students with disabilities may receive additional support from rehabilitation centers, all feel that they are lacking needed support – a situation that can be an obstacle to the effective use of computers in the cegeps. As for learning and training on computers, some professors, students with disabilities, and service providers mentioned the possibility of taking formal courses. But the most popular way to learn computer technologies was on one's own or, for professors and service providers, learning from the students themselves. Yet, students, too, noted that they lacked knowledge about how to use computers and how to obtain information about what computer technologies are available. Those who could show students with disabilities how to use computers - service providers and professors – indicated that they do not have the time necessary to learn and train. Difficulties in this area may explain why some students with disabilities do not use computers in school. In fact, some students specified that they did not use computers because they felt computers were too difficult to use. Lack of training resources is particularly important to keep in mind when planning services for students with disabilities. In addition to the lack of resources, incompatibility, unreliability, malfunction and obsolescence of institutional and personal computers increase the frustration of users and may explain why some choose not to use computers in school. All three groups mentioned some of these obstacles. Even if the computers at the cegeps were fully operational and up-to-date, these are sometimes not accessible to students with disabilities.

Participants in all three groups acknowledged that computer and adaptive computer technologies could be helpful for students with disabilities. Students' and professors' wish-lists call for improved equipment and increased opportunities for training. As stated by Goodman (2000), the learning component is vital to students using technologies

Whether concerted action or case-by-case accommodation is better is not a question that can be answered by the data. All groups seemed to agree that the case-by-case system is satisfying, but this seems to work well in cegeps with few students with disabilities. We cannot say whether this approach would work better than a more systematic approach in large cegeps.

Since our key question referred to provincial subsidy programs, we gathered an important amount of information on the subject. It is interesting to note that though students, service providers and professors all mentioned that students have their own equipment, the three groups most frequently agreed about the negative features of the programs. All three groups agreed that lack of money is an obstacle to the educational use of computers. Although subsidy or equipment loan programs for students could be a solution, many obstacles either prevent students from using existing government programs or create problems using them. Second, service providers, professors, and students with disabilities - whether they used a subsidy program or not - all mentioned that the criteria, restrictions, and the complicated application process are obstacles to the use of the government programs. Frustration about delays was mentioned both by students and service providers. Subsidy programs also have limitations in the types of equipment they make available and in support for upgrades and updates. More financial support would, therefore, be a solution according to professors and students. Nevertheless, it should be noted that some service providers and a few students with disabilities found the programs satisfactory.

In conclusion, it seems that computers can be helpful to students with disabilities in cegeps but that a variety of obstacles prevent the full potential of computer technologies from being realized. While we cannot clearly identify the causes of all problems, we can speculate that a more global and collaborative organization would be beneficial to all. Some service providers mentioned a consulting agency, students proposed that they should be included in the development of specialized software and hardware, and professors wished for a resource person. These are some of many possible solutions to a more integrated organization of computer technologies and services for students with disabilities in the cegeps.

Study 2: Questionnaire Study Of Students - Method And Findings

Overview

A questionnaire investigating the use of computer and adaptive computer technologies as well as attitudes and views about computers was developed for dissemination to students with disabilities. Questionnaires, which contained 29 groups of questions, were adapted for administration in the following formats in both English and French: regular and large print, audiotape, Braille, and computer disk (IBM and Macintosh). Questionnaires were distributed in three ways. (1) We contacted personnel responsible for providing services to students with disabilities and asked them to make questionnaires available on their campuses. These individuals indicated the number of questionnaires they wanted in each format. (2) Questionnaires were mailed directly to students who were members of our two student partner organizations [National Educational Association of Disabled Students (NEADS) and the Association Québécoise des étudiants(es) handicapés(es) au post secondaire (AQEHPS)]. (3) A limited number of questionnaires were distributed by team members to personal contacts. In total, 76 questionnaires were returned by current or recent cegep students with disabilities. All had been students during the past 2 years. Questionnaires were distributed in 1999.

Participants

Participants were 76 Québec cegep students with various disabilities (40 females and 36 males). Participants represent 30 different colleges, including 2 private institutions (1 English, 1 French). 3 participants were not currently enrolled in postsecondary education but had been students during the past 2 years. All participants were enrolled in a 2 or 3 year diploma program except for 3 who were merely taking courses (see Table 2.01). 23 responses are from the 6 English cegeps in the system and 53 are from students enrolled at 24 different French colleges (see Table 2.02 for a listing). All students enrolled in French cegeps indicated speaking French more often than English (francophones). 21 of the 23 students enrolled in English cegeps indicated speaking English more often than French (anglophones).

See Tables 2.01 and 2.02 in the Appendix

The composition of the final student sample of 76 is as follows. 96% of participants were students when they completed the questionnaires. The remainder were not currently students but had been attending school during the previous 2 years. 91% of current students were pursuing a cegep diploma or certificate (37 females, 32 males), 5% were taking courses outside of a formal diploma program (2 females, 2 males), and 4% were students during the past 2 years, although they were not attending postsecondary education currently. Former cegep students who were currently attending university were excluded from the sample. Table 2.01 provides additional details.

Mean age of student participants was 23 (standard deviation = 7, range = 17 to 51). The median was 20 and the mode 18. It can be seen in Figure 1 that the distribution is skewed in favor of younger students.

See Figure 1 in the Appendix

Students had a variety of impairments/disabilities. The largest group of students (41%) had a mobility impairment, 28% of the sample had either a visual or a hearing impairment, 27% had problems using their hands or arms, 17% had a learning disability (26% in English and 13% in French cegeps), 12% had a speech impairment, 5% had a medical impairment, 1% had a psychiatric impairment, and 8% had other impairments. More than half of the sample (55%) had multiple impairments; the mean number of impairments was 1.71 per student. (see Table 2.03). It should be noted that both the mean and the distribution of frequency scores indicate that approximately 1/2 of the students felt that their financial situation was inadequate in meeting their needs.

See Table 2.03 in the Appendix

More than 2/3 of the respondents (77%) indicated that their disability was present since childhood (age less than 10), and only 3% of responses reflected a recently acquired disability (past 5 years), with the remaining responses indicating somewhere in between (see Tables 2.01 and 2.04).

See Table 2.04 in the Appendix

It can be seen in Table 2.01 that the majority of students were enrolled in social sciences - either pre-university or careers programs (64%) while slightly less than a quarter (24%) were enrolled in science and engineering pre-university and careers programs. 9% of students were enrolled in creative arts. The programs of the remaining students could not be classified.

Procedure

Questionnaires were distributed and collected in 1999. Questionnaires went through multiple drafts and were pretested by students with various disabilities. Pretesting included the various adapted formats of the questionnaire both in English and French.

The final version of the questionnaire was made available in French and English in the following alternative formats: regular and large print, audiotape, Braille, computer disk (IBM and Macintosh). With each format, care was taken to ensure that the format of questions was appropriate to the modality and that the student had the option to respond in alternative ways. For example, references to "circling numbers" or "placing a check mark" did not make sense for the cassette tape or the Braille versions. Extensive formatting changes had to be made for the large print version. Modifications had to be made for the diskette version which would permit respondents to either answer directly on the diskette or to respond by typing, e-mailing, Brailling or audiotaping. IBM diskettes contained 3 file formats; DOS, ASCII text, Word 6.0/95, and WordPerfect 5.1 (DOS). Macintosh diskettes were requested only by English cegeps. These contained 6 file formats: plain text, ClarisWorks 4, WordPerfect 2, Word 4.0, MacWrite II, and Rich Text Format. Students had the option of responding in the modality of their choice. Most items requested yes/no answers or ratings of agreement/disagreement using a 6-point Likert scale (1 = strongly disagree, 6 = strongly agree).

Questionnaires were distributed primarily through bulk mailings to 43 college personnel responsible for providing services to students with disabilities who agreed to make these available to students at their institution. 357 questionnaires were distributed in this manner. Personnel responsible for providing services to students with disabilities indicated the number of questionnaires they wanted in each format [i.e., regular and large print, audiotape, Braille, computer disk (IBM and Macintosh)]. A small number of questionnaires were also distributed to personal contacts and to members of our two partner organizations: NEADS and AQEIPS.

Questionnaire packages included a stamped, self addressed envelope, cover letter, consent form, and a "tear-off" form to complete if students wanted a copy of the findings; here students could specify their preferred format (e.g., large print, computer disk, audiotape). All non-print versions distributed were packaged together with a regular print version of the questionnaire.

Once completed questionnaires were received, open-ended responses (e.g., name of adaptive equipment used, program of study) were quantified using predetermined categories and, along with the closed-ended responses, entered into an Excel spreadsheet for subsequent analysis using SPSS (Statistical Package for the Social Sciences) Version 8.

Questionnaire

The final questionnaire consisted of 29 groups of questions: most are closed-ended and use a 6-point Likert scale with 1 indicating strongly disagree and 6 indicating strongly agree. Questionnaires were made available in English and French. In addition to the regular print versions, questionnaires are available in the following alternate formats: large print, audiotape, Braille, IBM-PC (3 file formats) and Macintosh (6 file formats) disk. Questions on the adapted versions were modified to permit respondents both to read and to complete the measure using alternate means of responding. Adapted versions in both languages are available in the EvNet Toolkit at the following Word Wide Web URL: http://socserv2.mcmaster.ca/srnet/toolkit/tktoc.htm.

Topics Covered in the Questionnaire

- Sex
- Age
- Language
- Name and location of college
- Field of study
- Qualifications pursued
- Nature and duration of disabilities/impairments
- Computer, information and adaptive technologies used at home
- Home computer technologies wish list
- Computer, information and adaptive technologies used at school
- School computer technologies wish list
- Determinants and predictors of computer use and non-use
- Adaptive computer technologies that could be useful to respondent in getting work done
- Recommendations to adaptive software and hardware companies
- Reasons for not using a computer
- Type of computer used
- Locations where computer is used during the school year
- Time spent using a computer and the internet
- Reasons for not using the internet
- Uses of the internet for the respondent
- Reasons for not taking advantage of a government program to obtain a computer or adaptive computer technologies
- Experiences with government programs which provide computer or adaptive computer technologies
- How did respondents obtain their computer or adaptive computer technologies
- Problems caused by computer technologies for the respondent

- Problems using computer technologies at school
- Are specialized adaptations needed to use a computer
- Reasons why needed specialized adaptations are not used
- Other issues (open-ended items)

Informed Consent

All versions of the questionnaire contained informed consent information. This specified the purpose of the project, benefits envisaged, task requirements, the right to withdraw at any time without penalty and the measures taken to ensure confidentiality. Potential participants were also informed that they may discuss any questions or concerns about this study with the project directors at any time.

Participant Recruitment

Questionnaires were distributed in three ways. The main method was through personnel responsible for providing services to students with disabilities. A limited number of questionnaires were mailed by our student partner organizations: NEADS and AQEIPS to their membership, and a few were distributed to some of our personal contacts.

A directory of personnel contacts is published by the National Educational Association of Disabled Students (NEADS), by the Association Québécoise des Étudiants Handicapés au Postsecondaire (AQEHPS), as well as by the Service d'Aide à l'Intégration Des Élèves (SAIDE) and le Services aux étudiants handicapés du Cégep de Sainte-Foy. We sought the help of individuals on these lists as well as of all service providers who worked at colleges which are members of either the ACCC (Association of Canadian Community Colleges) or the Fédération des Cégeps. Personnel responsible for providing services to students with disabilities are the individuals identified at postsecondary institutions who are charged with any number of support services to postsecondary students with disabilities (in a small number of situations where there was no individual specifically designated to perform this task, primarily in smaller institutions, we were directed to staff in either counselling, student services or the registrar's office). They or their staff made the questionnaires available to students at their institutions.

The 43 participating personnel responsible for providing services to college students with disabilities were solicited as follows. We phoned individuals at Québec colleges which were listed in 1999 on the relevant web pages as members of: the Fédération des Cégeps, the Association of Canadian Community Colleges (ACCC), or whose names appeared on the lists described above. There was considerable overlap between the Fédération des Cégeps, where we contacted all 48 public Cégep members and the ACCC. Several cegeps had multiple autonomous campuses and sectors. In this case, we tried to contact all 72 of these campuses and divisions.

Research team members phoned personnel responsible for providing services to students with disabilities at all colleges whose names appeared on these lists. In cases where we mailed questionnaire packages to multiple campuses (e.g., regional colleges where campuses were located in different cities), we counted these as individual institutions.

Once someone was reached, this individual was provided with an explanation of the goals of our project and asked if they would be willing to assist us by distributing our questionnaires to students with disabilities attending their institution. It was explained that: we were looking for both users and non-users of computers; that we were interested in hearing from the largest cross-section of students with disabilities; and that we had questionnaires available in a variety of alternative formats (regular and large print, on tape, in Braille and on computer disk).

Of the 72 institutions which had a student body and were not merely administrative groupings, 9 (13%) indicated that they had no students with disabilities. 20 (28%) were left telephone messages but failed to return our calls; these institutions may or may not have had students with disabilities. Individuals from the remaining 43 institutions (60%) agreed to participate. Thus, all institutions which we were able to reach and which indicated that they had students with disabilities agreed to participate. Several individuals responsible for providing services to cegep students with disabilities indicated that they were responsible for several autonomous campuses/sectors and that they would ensure that questionnaires were distributed to all of these. Personnel responsible for providing services to students with disabilities who agreed to make questionnaires available at their institutions were asked how many questionnaires in each of the adapted formats they were willing to receive. A total of 43 separate institutions were sent packages containing 357 questionnaires.

Personnel responsible for providing services to students with disabilities indicated the number of questionnaires they wanted in each format. Institutions were sent between 1 and 88 questionnaires (standard deviation = 14, median = 4) (see Table 2.05). The format of most of the questionnaires requested was regular print (77%). 3% were on audiotape, 9% in large print, 6% on IBM diskette, 4% in Braille, and less than 1% on Macintosh diskette.

See Table 2.05 in the Appendix

Questionnaires were sent to the 43 personnel responsible for providing services to students with disabilities at the various colleges (see Table 2.05). Of these, 137 were in English, and 220 were in French. The number of questionnaires distributed to the 37 French and 6 English institutions/sectors can be seen in Table 2.05. Table 2.02 indicates the number of questionnaires sent to each college as well as the number of responses received from students.

Once the packages reached the institutions, we left it up to the discretion of the personnel responsible for providing services to students with disabilities how they would make questionnaires available to students. A cover letter was included with each package that directed those receiving them to make them available to the "widest cross-section" of students with disabilities, and to make them available to both computer, information and adaptive technologies users and non-users, if at all possible.

All participating institutions were recontacted to ensure that they had received the questionnaires, to answer any additional questions they had, and to remind these individuals to make the questionnaires available to students. These follow-up phone calls to schools also revealed the following information regarding how our questionnaires were made available to students: (1) some placed our questionnaires in public areas (e.g., computer labs, on counters in the office providing services to students with disabilities) for students to pick up; (2) some sent the questionnaires to various points of contact for students with disabilities (e.g., advisors, counsellors, etc.) who were then asked to make these available to students; (3) some schools mailed our questionnaires to students directly; and (4) some service providers distributed the questionnaires themselves. The number of schools using specific distribution methods is unknown. This makes it impossible to calculate a "return rate".

Questionnaires were mailed by our partner organizations NEADS and AQEIPS directly to students who are members. These organizations do not distinguish between cegep and university students. Research team members also distributed questionnaires to cegep students with whom they were acquainted. How many of these questionnaires were returned is unknown.

Enrollment Data

To enable us to conduct analyses which dealt with the size of the college and the number and percentage of students with disabilities, data concerning student enrolments were obtained. Because of the different ways in which disabilities are defined, we used two estimates. One is based on "Official" figures for 1999 provided by the Service d'Aide à l'Intégration Des Élèves (SAIDE) at Cegep Vieux Montréal (Senécal, 2000) and by Le Service aux étudiants handicapés du Cégep de Sainte-Foy (Juhel, 2000). The other is based on data obtained in 1998 by AQEIPS (1999). These are described in Study 3. Where information was not available in these sources, we contacted the registrar's office of the college. Enrolment data for the 30 institutions from which student responses were received are presented in Table 2.06.

See Table 2.06 in the Appendix

The average total enrollment in the 30 colleges represented by the student participants was 3,384 (standard deviation = 2,126, range = 256 to 7,308, median = 3177). The mean percentage of students with disabilities was 0.32% (standard deviation = 0.40%, range = 0% to 2.05%, median = 0.21%). 50 students were enrolled in cegeps in the metropolitan areas comprised by Québec's major cities (Montréal, Québec, Hull) and 26 were enrolled in cegeps in the smaller communities represented by Québec's Regions. Additional data are available in Table 2.06. Breakdowns related to the provenance of students' responses (i.e., French cegeps in the Cities vs. the Regions, English vs. French cegeps in the Cities) are available in Table 2.07.

See Table 2.07 in the Appendix

Results: Study 2

Students' Experiences With Computer, Information And Adaptive Technologies

Users and non-users of computers and the internet. The overwhelming majority of respondents, 71 of the 76 participants (93%) indicated that they used a computer. 29% of computer users indicated that they needed adaptations to do so (e.g., screen magnification, dictation software, Braille note taker). 2 of the 5 students who indicated that they did not use a computer indicated that they would need adaptations if they were to use a computer. 64 students, 84% of the participants, indicated that they used the internet.

Computer and Internet Use and Attitudes Toward Computers

English and French cegeps. It can be seen in Table 2.08 that 100% of the students from English cegeps and 91% of those from French cegeps indicated using a computer. 83% of students from English and 85% of students from French cegeps use the internet. Chi Square tests show no significant differences in the proportion of students who use a computer in English and French cegeps. The same is true for internet use. A t-test indicates that anglophone ($M = 3.40$) and francophone ($M = 3.06$) students do not differ on ratings of the adequacy of their financial situation to meet their needs, $t(71) = .72$, $p > .05$.

See Table 2.08 in the Appendix

Computer related attitudes of anglophone and francophone students were compared using a series of t-tests. A t-test on adequacy of income shows no significant difference between City ($M = 2.89$) and Regions ($M = 3.23$) respondents, $t(51) = .66$, $p > .05$. Results in Table 2.09 revealed 5 significant differences. In 4 of these, anglophone students' attitudes were more favorable toward computers than those of francophone students, while in the fifth the situation was reversed. After a Bonferroni correction to the alpha level, however, only one of these remained significant: this showed that anglophone students considered their level of expertise with computer technologies to be better ($M=5.00$) than did francophone students ($M = 3.58$), $t(74)=3.49$, $p < .001$.

See Table 2.09 in the Appendix

Cities versus the "Regions:" French cegeps. A potential confound in the above evaluation concerns city versus "Regions" location. All English cegeps are located in major urban centers. However, only about half of the students enrolled in French cegeps attend colleges in urban centers (n=29). The rest attend cegep in the Regions (n=26). To explore whether City vs. Regions location is associated with computer use, Chi Square tests were performed. These and scores in Table 2.10 show that City students are more likely to be computer users than Regions students, $X^2=[1,(n=55)]=6.14$, $p < .05$. The proportion of francophone students who use the internet in Cities and in the Regions did not differ significantly.

See Table 2.10 in the Appendix

When attitudes toward computers were evaluated, results in Table 2.11 showed only two significant differences between students from French cegeps in the Cities and in the Regions: one favored Cities, the other Regions. After a Bonferroni correction to the alpha level, however, neither of the two comparisons remained significant.

See Table 2.11 in the Appendix

Sex differences. To evaluate differences between female and male students with disabilities Chi Square tests and a series of independent t-tests were performed. The data show no significant difference in self-rated adequacy of financial situation between males ($M = 3.44$) and females ($M = 2.90$), $t(71) = 1.29$, $p > .05$. Results in Table 2.12 and the Chi Square tests show no significant differences in the proportion of male and female students who use a computer. The same is true for internet use.

See Table 2.12 in the Appendix

Of 19 t-tests on variables related to attitudes, views and experiences with computers, only 1 is significant (see Table 2.13). This suggests that, on a 6-point scale, male students ($M=4.44$) considered themselves to be more expert computer users than female students ($M=3.55$), $t(74)=2.36$, $p < .05$. After a Bonferroni correction to the alpha level, however, this difference was no longer significant.

See Table 2.13 in the Appendix

Age differences. Before checking on the relationship between computer related expenses and attitudes we investigated the relationship between age and income adequacy. The Pearson product-moment correlation coefficient was not significant $r(74) = -.046$, $p > .05$. An independent t-test on francophone students (all anglophone students indicated using a computer) shows no significant difference between the mean age of students who use computers (M=22.92) and those who do not (M=22.00), $t(53)=.248$, $p>.05$. It can be seen in Table 2.14 that correlations between age and time spent per week using the computer and the internet were low and nonsignificant. We also examined the relationship between student age and a host of variables related to attitudes, views and experiences with computers.

See Table 2.14 in the Appendix

Correlations between age and 17 variables which measure frequency, comfort, expertise, and other aspects of self-evaluation, experiences, and beliefs about computers are presented in Table 2.14 for the whole sample. Only one of the Pearson product-moment correlation coefficients was significant. However, the r value even on this variable ("I am a person who dislikes computers") was only .30.

We also examined the relationship between age and 13 ratings of various problems caused by computers. Here we found that 3 variables were significantly related, but, once more, coefficients hovered around the .30 level.

Although the 4 significant correlations out of 32 tests conducted all favored younger students, the paucity of significant relationships and the low r values on those which were significant suggest that age was not substantially related to the variables of interest.

Equipment For Students With Disabilities

All students indicated the types of adaptive computer technologies that could be useful in getting their work done. The most popular computer technologies were sophisticated or adapted versions of mainstream equipment which students felt they needed to accommodate their disabilities. This can be seen in Table 2.15. For example, the most valued technology was spelling and grammar checking, followed by a scanner and a portable note taking device that could be taken to class. Voice recognition software (dictation) and the availability of materials in electronic format (e.g., books, hand-outs) were also reported as especially useful. While such equipment is likely to be useful for all students, for students with disabilities such technologies are a necessity.

See Table 2.15

Almost 30% of the sample (22 students - 20 of whom were computer users) indicated that they needed special adaptations to use a computer. The types of adaptations students with specific disabilities felt would be useful are presented in Tables 2.16, 2.17, 2.18, and 2.19.

See Tables 2.16, 2.17, 2.18, and 2.19 in the Appendix

It is noteworthy that of the 20 computer users who needed adaptations, only 75% indicated that they used them. As reported in Table 2.20, a belief that adaptations are unavailable, a lack of interest, available computers not having adaptations on them, and lack of knowledge about how to use these were cited by the remaining students as reasons for not using adaptations.

See Table 2.20 in the Appendix

What Kinds Of Equipment Do Students Who Use Computers Actually Use?

67 of the 69 computer users who answered this question (97%) use some type of computer at home. 70 of the 71 respondents (99%) use a computer at school. 90% of computer users indicated that they used the internet. It can be seen in Table 2.21 that 67% of computer users use the internet at home and 77% use it at school. Most respondents who do not have a computer or internet access at home wish that they did. Similarly, although relatively few students indicated using a laptop either at home (21%) or at school (22%), substantial numbers of students who do not have a laptop wish that they had one. It can also be seen in Table 2.21 that approximately half of the students who do not adaptive hardware or software at home wish that they did.

See Table 2.21 in the Appendix

Table 2.22 presents data about what types of computers students use at school and where they use them. Most students use an IBM compatible (86%). Only 24% use a Macintosh. Some students used both platforms. 10% of students use another type of computer (e.g., Tandy, Commodore). Students who use a computer at school use it most often in a general use computer lab (82%). They also use computers often during class lectures (62%) and in the library (58%). Only 31% of students use a computer in an office for students with disabilities or in a specialized computer lab.

See Table 2.22 in the Appendix

Table 2.22 also shows that while there are minimal differences between males and females in this regard, students from English cegeps are substantially less likely to use computers in class and more likely to use computers in an office for students with disabilities than their francophone peers.

It can be seen in Table 2.23 that students' responses indicate that English institutions appear to have the edge when it comes to desktop computers, laptops, and adaptive hardware and software at school. When it comes to the Internet, however, English and French cegeps are similar. Although males and females indicated similar types of use, students from French cegeps in the Cities seemed to use a greater diversity of technology than students in the Regions; in particular, more City students seem to use laptops.

In Table 2.23 one can see that students' responses indicate that English institutions appear to have the edge when it comes to the availability of desktop computers, laptops, and adaptive hardware and software on campus. When it comes to the internet, however, English and French cegeps are similar. On the Francophone side, although males and females indicated similar types of technology used, students from cegeps in the Cities seemed to use a greater diversity of these than students from the Regions. This seems especially noteworthy in the case of laptop use.

See Table 2.23 in the Appendix

Students indicated spending approximately 9 hours during a typical school week using a computer (exclusive of the internet) and 6 hours using the internet. Means in Table 2.24 suggest that males generally spend the most time using computers as well as the internet. Similarly, students in English cegeps spend more time than students in French cegeps. However, given the huge variability in scores, as demonstrated by standard deviations that are similar to the means, t-test results indicate no significant differences between males and females, between English and French city cegeps, or between French City and Regions cegeps on either computer use or internet use.

See Table 2.24 in the Appendix

The most frequently noted reason for using the internet is doing research. Other popular reasons include e-mail (friends/family), entertainment, participating in chat rooms, getting software, and accessing library materials. E-mailing professors and taking courses on line were not popular options. Table 2.25 provides additional details

See Table 2.25 in the Appendix

When the 7 computer users who do not use the internet were asked why, their responses, detailed in Table 2.26, indicate that they (1) had no access to a computer that is equipped to go on line, (2) that it costs too much, (3) that available browsers and e-mail programs don't work well for them, (4) that using the internet ties up the phone line, and (5) that some features of the Web are not accessible to them. Lack of interest and lack of availability were not popular responses.

See Table 2.26 in the Appendix

Problems With Computers Noted By Students Who Are Computer Users

The most common problem noted by students is that computer technologies cost too much to buy. Other problems, which are summarized in Table 2.27, include: the need for continual upgrading, hardware and software compatibility problems, crashes, few opportunities for training on adaptive technologies, and that they are frustrating/difficult to use.

As noted earlier, it can be seen in Table 2.14 that age was significantly related to problematic experiences on only 3 of 13 comparisons. The relationships even for these were modest (r approx. = .30), suggesting that age was not an important factor in problematic experiences.

See Table 2.27 in the Appendix

Also reported in Table 2.27 are the responses of students who need adaptations to use a computer effectively. These indicate the same concerns as students who do not need adaptations with one exception. These students don't find the equipment especially frustrating or difficult to use, but they do indicate that computer labs where courses are held lack suitable adaptations for them.
Means and test results in Tables 2.28 and 2.29 indicate that there are no significant differences between anglophone and francophone students on these variables or between students from French cegeps in Cities and in the Regions.

See Tables 2.28 and 2.29 in the Appendix

Problems at school. The most common problems with computers located at school is that students have received insufficient training, that both mainstream computer labs and specialized labs with adaptive equipment are generally overcrowded, and that students' schedules and computer labs' hours of access are incompatible. Students who need adaptations to use a computer effectively also complained of insufficient training. They, however, rated lack of suitable adaptations for their disabilities and inefficient technical support as serious problems and indicated that using computer technologies in class makes them stand out. Table 2.30 provides additional details.

See Table 2.30 in the Appendix

t-tests comparing scores on the 8 items related to problems with computers located on campus indicate only that students in English cegeps are more likely to feel that using computers in class is disruptive to the rest of the class, $t(41) = 2.04$, $p<.05$, and that students at French cegeps from the Regions are more likely than their peers in Cities to feel that their schedule and the hours of access to computers are incompatible, $t(40) = 2.36$, $p<.05$. It can be seen in Tables 2.31 and 2.32 that after a Bonferroni correction to the alpha levels, even these differences fail to attain significance.

See Table 2.31 and 2.32 in the Appendix

How Students With Computer And/Or Adaptive Computer Technologies At Home Acquired These

97% of the computer user students indicated that they had a computer at home: 100% of students from English cegeps and 96% from French cegeps. A Chi Square test indicates that this difference is not significant.

Table 2.33 provides details on all sources that students used to obtain computer technologies. The most common method was to have their families buy it for them (48%) or to buy it for themselves (27%). Provincial governments also provided some equipment (19%), as did cegeps' loan programs (11%). Chi Square tests indicate no significant differences between students attending English and French cegeps on any of these variables.

By far the most common way for students to obtain computer technologies was to have their families buy it for them (48%) or to buy it for themselves (27%). It can be seen in Table 2.33 that provincial governments also provide some equipment (19%), as do the cegeps' lending programs (11%). Table 2.33 provides details on all sources. Chi Square tests indicate no significant differences between students attending English and French cegeps on any of these variables.

See Table 2.33 in the Appendix

Experiences Of Computer User Students With Provincial Government Programs

Of the 69 students who used a computer at home and responded to this question, 29% indicated that they had taken advantage of a program [7 of 21 (33%) anglophone and 13 of 48 francophone (27%)). Slightly more than half (n=11) of them needed adaptations to use a computer effectively.

The number of students who indicated taking advantage of a government program in response to this question is greater than the number who indicated government as sources for financing their equipment. We assume that the discrepancy is because some students may not have identified equipment given to them by rehabilitation agencies as being provided by the government.

Although the highest ranked response was that the waiting period was very long, in general, students were pleased with equipment obtained through a Québec government program. It can be seen in Table 2.34 that they felt that the equipment they received was up-to-date, that it met their needs, and that the program was flexible in accommodating students' requirements. On the other hand, students also felt that there were many restrictive rules and regulations, that they did not receive good training on the technology, and that the application process was complicated. Looking at Tables 2.34 and 2.35, it is evident that in general, anglophone and francophone students had similar concerns. This was also the case for students who needed adaptations to use a computer effectively and those who did not.

See Tables 2.34 and 2.35 in the Appendix

The majority of students did not avail themselves of a subsidy/loan program to obtain a computer or adaptive computer technologies. Table 2.36 provides a breakdown of the impairments of students who took advantage of a government program. This shows that over half of the students with visual impairments took advantage of such a program as did half of the students with problems using their hands and arms. Slightly more than 40% of students who used a wheelchair took advantage of a government program as did a third of the students with a speech impairment. Only 8% of students with a learning disability and an astonishing 0% of the 20 students with hearing impairments took advantage of any available programs.

See Table 2.36 in the Appendix

When asked why, it can be seen in Table 2.37 that the most common answer was that students were not aware that there were any programs out there for them. In fact, when students were invited to write additional comments, many spontaneously mentioned that now that they knew that there were programs where they could apply, they would be sure to investigate their options. The same table summarizes reasons why students chose not to apply, even though they knew about the availability of provincial programs. These included that they preferred to buy the equipment they needed; that their own or their family's income was too high for them to qualify; that the process for applying was complicated; and that the nature of their disability excluded them from existing programs. Finally, the rankings in Table 2.37 and the non-significant t-tests in Table 2.35 show that few substantial differences between anglophone and francophone students exist.

See Table 2.37 in the Appendix

Why Students Do Not Use A Computer

5 of the 76 students (7%) indicated that they did not use a computer. When asked why, their answers, presented in Table 2.38, include: computers are not available to them, they cost too much, adaptive computer technologies that they need to access a computer work poorly for them, the technology makes them anxious, and it is too expensive to maintain.

See Table 2.38 in the Appendix

Suggestions For Adaptive Computer Hardware And Software Companies

We also asked students to make recommendations to adaptive computer hardware and software companies. It was not surprising that the most common suggestion made was to provide student discounts (87%), to make adaptive hardware and software less expensive (78%), and to provide grants to educational institutions to purchase equipment for student use (53%). Other suggestions, detailed in Table 2.39, stress that companies should provide trial periods (49%), ensure that advertising reaches students with disabilities (46%), and make their products more user friendly (45%). Other less frequently endorsed suggestions, are detailed in Table 2.39.

See Table 2 39 in the Appendix

Discussion - Study 2

Sample Characteristics

The students in our sample were representative of the population on age because, as is commonly reported in studies of students with disabilities (cf., Horn & Berktold, Fichten et al., 1990), our participants, too, were slightly older than their nondisabled counterparts. The mean age was 23, although most students were younger than 20. Students had a variety of impairments/disabilities, with more than 2/3 of students indicating that they have had their disability since childhood. Very few students acquired their disability recently. In response to a question inquiring about income, approximately 1/2 of the students indicated that their financial situation was inadequate in meeting their needs; This is consistent with an earlier report published by the National Educational Association of Students with Disabilities (Behnaz, Brassard, Locheed, Shellenburg, & Smith, 1993).

Almost 2/3 of students were enrolled in social sciences - either pre-university or careers programs, with less than 1/4 enrolled in science and engineering pre-university and careers programs. Less than 10% of students were enrolled in creative arts. The rank order of students' impairments/disabilities in the sample is as follows:

- mobility impairment
- visual impairment
- hearing impairment
- problems using hands or arms
- learning disability (26% in English and 13% in French cegeps)
- speech impairment
- medical impairment
- psychiatric impairment

More than half of the sample (55%) had multiple impairments; the mean number of impairments was 1.71 per student. These results differ somewhat from findings reported for an American sample (cf., Horn & Berktold, 1999). This showed that of students who reported having a disability, 29% had a learning disability, 23% had an orthopedic disability, 16% had a hearing impairment, 16% a visual impairment and 21% had other, mainly medical disabilities. Here, too, some students had multiple impairments, but this proportion was somewhat lower than in our sample.

Limitations And Sampling Issues

This investigation has a number of limitations. While the sample size is large - 76 individuals - and diverse both in age and in terms of students' academic programs, disabilities and computer experiences, it is by no means random. Nor is it representative. Given self-selection biases, we expect that the proportion of computer users as well as of individuals who are in contact with their institutions' offices for students with disabilities are overrepresented. In addition, while we mailed questionnaires to members of our two student organization partners, AQEIPS and NEADS, most students with disabilities do not belong to such organizations. So these students, too, might be overrepresented.

Perhaps even more troubling, we are unable to calculate a "return rate" because of the manner in which questionnaires were made available to students and because of the uncertainly about the actual number of students with disabilities in the cegep system. Some questionnaires were handed to students by personnel responsible for providing services to students with disabilities. Others, were mailed directly to students' homes. In the overwhelming majority of cases, however, questionnaires were simply made available for students to pick up in the same way in which "free" advertiser supported newspapers are made available. For example, "Micro Québec" and "Voir," which are put in boxes or racks near entrances and exits and made available for shoppers to pick up, free of charge, in computer stores and supermarkets, respectively. Another problematic area concerns the calculation of how many students with disabilities attend cegeps. According to "official" statistics based on the fall of 1999, the number of students with disabilities enrolled in the 48 public cegeps which belong to the Fédération des cegeps is 297 (Juhel, 2000; Senécal, 2000, Alice Havel, personal communication, April, 2000). For the same period, the data we report in Study 3 shows that there were more than 832 students with disabilities enrolled in 1999. According to the AQEHPS (1999) report, which is not based on "official" data but on a survey of individuals responsible for providing services to cegep students with disabilities, there were 524 students enrolled in the fall of 1998. Such wide discrepancies in the "population" parameter also makes it difficult to calculate a return rate.

Sampling issues. Despite problems with exact population head counts and calculation of return rates, those indices which are available suggest that the sample has characteristics which resemble the realities of college students with disabilities in Québec. The sample contains slightly more female than male students; this, too, is characteristic of students in Canadian postsecondary institutions (Statistics Canada, 1999b). The age range of students is normative for studies of students with disabilities and the proportion of arts and science students is typical of other studies of students with disabilities (Amsel, R., & Fichten, 1988, 1990a, 1990b; Fichten, 1986; Fichten & Amsel, 1986, 1988; Fichten et al, 1987, 1988, 1989, 1990, 1991; Hill, 1992, 1996; Horn & Berktold, 1999). Moreover, while data collected in Study 3 show that approximately 14% of cegep students are enrolled in English cegeps and 86% in French cegeps, the data also show that there are approximately twice as many students with disabilities enrolled in English than in French cegeps. Thus, the ratio of 21 anglophone to 55 francophone students almost perfectly matches the population parameter of cegep students with disabilities. The majority of students use IBM-compatible computers. This too, is typical of postsecondary students (Cuneo, 2000).

Possibly the most valuable aspect of this investigation is not the representativeness of the sample but the interplay between the quantitative data of Studies 2 and the in-depth perspective provided by the focus groups of Study 1. The data, thus, allow us to provide meaningful answers to specific questions requiring comparisons between the perspectives of different groups of students. What kinds of equipment do students with different disabilities need and want? What do students with specific needs find problematic and what do they find really helpful? What kinds of computer technologies do students use? What kinds of adaptations do they find helpful? Are there differences between male and female students? What about student age? The study's main strength lies in its ability to provide answers to such questions.

Equipment For Students With Disabilities

Almost 1/3 of the sample indicated that they needed special adaptations to use a computer. Some students who needed adaptations did not use these. Reasons cited include: it is unavailable to them, they are not interested in using these, available computers do not have adaptations, and they don't know how to use the adaptations.

When students indicated the types of computer technologies that could be useful in getting their work done the most popular computer technologies were mainstream software and hardware which many students used as adaptations to accommodate their disabilities. For example, the most valued technology was spelling and grammar checking, followed by a scanner and a portable note taking device that could be taken to class. Dictation software (voice recognition) and the availability of materials in electronic format (e.g., textbooks, course hand-outs) were also seen as especially useful. It should be noted that while such adaptations are likely to be useful for all students, for many students with disabilities such technologies are a necessity.

Sex and age differences. Although this was not part of the original intention, the data in two of the studies lent themselves to an analysis of age and sex differences. Because we had not set out to investigate these variables, the questions were not designed with these variables in mind. Having said that, the results of the two studies were surprisingly consistent, both with each other and with the literature on nondisabled individuals (e.g., Czaja & Sharit, 1998; Kirkup, 1999; Meyer, et al., 1997; Price & Winiecki, 1995; Shashaani, 1997; Whitely, 1997). The findings indicate that age and sex are only minimally associated with computer related views and experiences, although what differences existed were consistent with those reported in the nondisabled populations (i.e., males and younger respondents were more likely to have favorable views and experiences than females and older participants).

Computer Users - What Equipment Do They Use And Where Do They Use Them?

Almost all computer users in our sample indicated that they used a computer both at home and at school. Two thirds of the students who use a computer use the internet at home and almost 80% use it at school. These figures are slightly greater than those reported by Campbell (1999) for nondisabled students, which showed that only 85% of students at Mt. Allison university had a computer and that in 1998, only 47% of students at a Montréal English university and only 24% of a Montréal English cegep used e-mail at school (corresponding figures for e-mail at home were 53% and 46%, respectively).

The few students who did not use a computer indicated that this was because computers are not available to them, that they cost too much, that adaptations they need to access a computer work poorly for them, that the technology makes them anxious, and that it is too expensive to maintain.

Most students use an IBM compatible (86%) but only 24% use a Macintosh. 10% of students use another type of computer (e.g., Tandy, Commodore). Students who did not have a computer at home wish that they did. The same is true of internet access That a home computer is important for students with disabilities is illustrated by Lee's (1998) findings which show that lack of availability of home computers to participants contributed to poor outcomes in an experimental education, career, and information technology training program for adults with disabilities. Also, data indicate that internet access has a variety of important benefits for people with disabilities (Hopps & Pepin, 1999). Similarly, although relatively few students indicated using a laptop either at home or at school, many students who do not have a laptop wish they had one. The same is true for students who need adaptations to use a computer effectively but do not have these.

Students who use a computer at school use it most often in a computer lab (82%), during class lectures (62%), and in the library (58%). Only 31% of students use a computer in an office for students with disabilities or in a specialized computer lab. Students indicated spending approximately 9 hours during a typical school week using a computer and 6 additional hours using the internet.

Students' Experiences With Computer, Information And Adaptive Technologies

Users and non-users of computers and the internet. The overwhelming majority of respondents, more than 90%, indicated that they used a computer. Almost 1/3 of students, both computer users and non-users, needed adaptations to do so effectively (e.g., screen magnification, dictation software). Almost all computer users (90%) used the internet. There were only minimal differences in computer use and in attitudes toward computers among the various groups studied: anglophones vs. francophones, males vs. females, younger vs. older students, and students from large cities vs. the outlying regions of Québec. The few differences found generally showed that anglophone students, males, younger students, and students from the cities had more extensive computer experiences and more favorable attitudes.

The internet. The most frequently cited reason for using the internet is doing research. These findings are similar to those reported by the UCLA's Higher Education Research Institute (Cooperman, 1999; CIRP Press Release, 1999) for American college freshmen, 83% of whom reported using the internet for research. Other popular reasons include e-mail (friends/family), entertainment, chat rooms, getting software, and accessing library materials. E-mailing professors and taking courses on line were not popular options. E-mail was also the most popular use for the internet in Clark's (1999) survey of people with disabilities; this was followed by listservs, discussion groups, newsgroups and chat rooms. Clark's participants, 69% of whom used adaptive technologies, also noted that internet helps them do research, communicate with friends and get computer related advice. Data from other laboratories also indicate that internet use has a variety of important benefits for people with disabilities (Hopps & Pepin, 1999).

When computer users who do not use the internet were asked why, their responses indicate that they had no access to a computer that is equipped to go on line, that it costs too much, that available browsers and e-mail programs don't work well for them, that using the internet ties up the phone line, and that some features of the Web are not accessible to them. Lack of interest and lack of availability were not popular responses. Cost has also been found in other investigations of computer users with disabilities who were not students as a major barrier to internet use by persons with disabilities (Sinks & King, 1998).

Problems With Computers Noted By Students Who Are Computer Users

The most common problem noted by students is that computer technologies cost too much to buy. This is consistent with other investigations of learners with disabilities (e.g., Lee, 1999) as well as with economic realities of persons with disabilities in Canada (cf., Fawcett, 1996) and the United States (Sinks & King, 1998). Other problems, in order of importance, include: the need for continual upgrading, hardware and software compatibility problems, crashes, few opportunities for training on adaptive technologies, and equipment that is frustrating and difficult to use. Students who need adaptations to use a computer effectively indicate the same concerns with one exception. These students don't find the equipment especially frustrating or difficult to use, but they do indicate that computer labs where courses are held lack suitable adaptations for them.

Given the concern with the cost of computer technologies, it was not surprising that the most common suggestion to developers and vendors of adaptive computer technologies was to provide student discounts. Other popular suggestions were to make adaptive hardware and software less expensive and to provide grants to educational institutions to purchase equipment for student use. Students also noted that companies should provide trial periods, ensure that advertising reaches students with disabilities, and that developers make their products more user friendly.

Problems at school. The most common problems with computers located at school are that students have received insufficient training, that both mainstream computer labs and specialized labs with adaptive equipment are generally overcrowded, and that students' schedules and computer labs' hours of access are incompatible. Students who need adaptations to use a computer effectively also complained of insufficient training. They, however, rated lack of suitable adaptations for their impairments and inefficient technical support as serious problems and noted that using computer technologies in class makes them stand out.

How Students With Computer And/Or Adaptive Computer Technologies At Home Acquired These

Virtually all students in the sample stated that they had a computer at home. Even though half of the students indicated that their financial situation was inadequate in meeting their needs, by far the most common way for students to obtain a computer was to purchase it themselves or have their families buy it for them. Provincial government programs also provided some of students' computer equipment; however, this accounts for less than 1/3 of students.

Approximately half of the students who took advantage of a government subsidy program needed adaptations to use computers effectively. In addition, the type of impairments students had was related to whether they used a government program to assist them with obtaining their technologies. For example, more than half of the students with visual impairments took advantage of a government program as did half of the students with problems using their hands and arms. Slightly less than half of the students who used a wheelchair took advantage of a government program. Only 1/3 of students with a speech impairment did so. But less than 10% of students with a learning disability and an astonishing 0% of the 20 participants with hearing impairments took advantage of government programs.

Experiences of student computer users who took advantage of a government program. The highest ranked response of student computer users who took advantage of a government program was that the waiting period was very long. Nevertheless, in general, students were pleased with equipment obtained through a government program. They felt that the equipment they received was up-to-date, that it met their needs, and that the program was flexible in accommodating their requirements. On the other hand, students also felt that there were many restrictive rules and regulations, that they did not receive good training on the technology, and that the process for applying was complicated.

Reasons why students did not take advantage of a government program to obtain a computer or adaptive computer technologies. The majority of students surveyed did not avail themselves of a government program to obtain a computer or adaptive computer technologies. When asked why, the overwhelming response was that students were simply unaware that there were any programs out there that could possibly help them. In fact, when students were invited to write additional comments, many spontaneously mentioned that now that they knew there were programs where they could apply, they would be sure to investigate their options.

Students who chose not to apply, even though they knew about the availability of programs, indicated that they preferred to buy the equipment they needed. They also noted that policies created barriers to allowing them to obtain computer technologies through a program. In particular, they indicated that their own or their family's income was too high for them to qualify, that the process for applying was complicated, and that the nature of their disability excluded them from existing programs.

Study 3: Telephone Interview Study – Service Providers - Method And Findings

Overview

During the spring of 2000, a structured interview protocol was developed and administered by telephone to 46 cegep personnel responsible for providing services to students with disabilities. Respondents were selected from the 48 public anglophone and francophone cegeps listed on the web page of the Fédération des cegeps (2000). Interviews consisted of 38 sets of questions and lasted between 5 and 25 minutes. Participants represent 38 of the 43 public cegeps which have students with disabilities.

Participants

Participants were 46 cegep personnel responsible for providing services to students with disabilities (22 females and 24 males). They represent 38 of the 43 public cegeps which had students with disabilities in 1999. Several cegeps have 2 or more autonomous campuses or units with different individuals responsible for services to students with disabilities. In this case, we attempted to interview all service providers. 6 participants came from anglophone and 40 from francophone cegeps. Approximately equal numbers of participants came from a City (i.e., greater Montréal, greater Québec, Hull) Cities (n=22; 48%) and 24 came from the Regions (52%). Respondents had worked providing services to students with disabilities for an average of 8 years (SD = 5, range = < 1 yr to 24 yr). Additional details about the sample are available in Table 3.01.

See Table 3.01 in the Appendix

Procedure

To recruit participants we attempted to contact, by telephone, the 97 individual campuses or sectors of the 48 public cegeps that were listed on the web site of the Fédération des Cégeps (2000); 8 of these were anglophone and 89 francophone. At this time we asked to speak to the person responsible for providing services to students with disabilities. Of the 48 cegeps, 5 indicated that they currently had no students with disabilities. It can be seen in Table 3.02 that of the 97 campuses or sectors which comprise the 48 public cegeps, 12 had no students - they were merely administrative or research units (e.g., Cégep André Laurendeau - Centre de documentation collégiale), 27 had students, but no students with disabilities. Potential participants at the remaining 58 campuses and sectors (i.e., those that did have students with disabilities) were asked to volunteer. 46 (79%) participated and 12 (21%) either refused outright, mostly citing time constraints, or we were unable to make appointments due to problems with scheduling and unreturned phone calls. The 46 participants represent 37 of the 43 (86%) public cegeps which have students with disabilities. For all others a time was scheduled for the interview. Interview questions were faxed or e-mailed to participants prior to the scheduled appointment to assist in the process. This included an informed consent form.

See Table 3.02 in the Appendix

At the scheduled time, participants were reminded about the goals of the project, their right to withdraw at any time without penalty, and the precautions taken to ensure confidentiality. To encourage honest responses, even if these did not reflect well on the educational institution, participants were assured that the information that they provide would never be linked either to themselves or to their educational institution. This was done because it is common in the field to publish descriptive comparative "accessibility profiles" of educational institutions.

Interviews were conducted during the spring of 2000. Interview questions were based on findings from our previous studies. The interview protocol went through multiple drafts and both English and French versions were carefully examined by our Advisory Board as well as by members of our Adaptech electronic discussion forum. The interview was pre-tested by both francophone and anglophone participants.

During the telephone interview the interviewer read each question and gave the respondent ample time to answer. Clarification was provided if participants were unsure of the meaning of particular questions. In some cases, participants simply read their responses to the questions in numerical order and, in a few cases, they faxed or e-mailed their responses.

Interview Questions

The final structured interview for personnel responsible for providing services to students with disabilities consisted of 53 items. Most items used 6-point Likert scales (1 = strongly disagree, 6 = strongly agree).

Items took two basic forms: "Actual Situation," which asked about the current situation on the respondents' campus or sector, and "Desired Situation," which asked about what would make things better. Most "Actual Situation" items were positively worded, described a set of conditions at the college (e.g., computer equipment is up-to-date), and stated that the characteristic met the needs of students with disabilities (e.g., At my institution, computer and/or adaptive computer technologies are sufficiently up-to-date to meet the needs of students with disabilities). The "Desired Situation" items revolved around making the job easier to perform if certain conditions were to be met (e.g., It would make my job easier if students with disabilities were knowledgeable users of computer and/or adaptive computer technologies). For 12 topics the two types of items, "Actual Situation" and "Desired Situation", were paired (e.g., "The availability of adaptive computer technologies in specialized labs/centres for students with disabilities at my institution meets their needs" and "It would make my job easier if there were more adaptive computer technologies available in specialized labs/centres at my institution"). This allowed for comparisons between actual and desired circumstances. A key criterion item inquired about how well, overall, the computer and/or adaptive computer technology needs of students with disabilities are met at the respondent's institution.

The questions were also designed to evaluate several concepts, with both "Actual Situation" and "Desired Situation" questions being included in each. Grouping concepts are as follows

1. Inside and outside the institution
    - Funding for institution's adaptive computer technologies

2. Inside the institution
    a. Access to adaptive computer technologies
        - Computer technologies up-to-date
        - Hours of access to computers
        - Off-campus loan program
        - Availability in specialized labs/centres
        - Physical space available for computer technologies
        - Training for students on adaptive computer technologies
        - Availability in mainstream computer labs

    b. Internet/library and adaptive computer technologies
        - Enough adapted computers with internet access
        - Library's computers accessible
        - Internet-based distance education accessible

    c. Support for adaptive computer technologies
        - Technical support
        - Consulted when computer infrastructure decisions made
        - Opportunities for employees to learn about adaptive technologies
        - Advisory/steering committee deals with computer accessibility
        - Administration reacts positively concerning computer accessibility
        - Computer support people can service adaptive technologies
        - Specialist in adaptive computer technologies on campus

    d. Faculty and computer accessibility
        - Computer-based teaching materials used by professors accessible
        - Faculty trained in adaptive computer technologies

3. Outside the institution factors
    - Agencies provide students with appropriate equipment
    - Agencies provide students with adequate training

4. Personal factors
    - Knowledgeable about adaptive computer technologies

Additional items inquired about the cegep's name and the campus(es) and sectors for which the respondent was responsible, demographic information about the cegep and students with disabilities ("Approximately how many students with all types of disabilities, documented or not, including learning disabilities, are enrolled at your institution?" and "Approximately what is the total student enrolment at your institution? (This includes students with and without disabilities and refers to the same campus(es) as the previous question)"), as well as personal factors, including how knowledgeable respondents were about adaptive computer technologies, how many years they had worked providing services to students with disabilities, and on a 4-point scale (1 = very high priority, 4 = very low priority), the priority they accorded to providing computer related services.

We also inquired whether there were computer or adapted computer technologies at respondents' institutions for students with disabilities and whether a provincial/regional loan program supplied some or all of the computer and/or adaptive computer technologies at the respondent's cegep.

Results

Enrollment Data

Because of the different ways in which disabilities are defined, in the present investigation we used three sources of information: that provided by the participants, data provided in a published report by AQEHPS (1999), and "official" data provided by the 3 designated "centres d'accueil" which are responsible for administrative aspects of services and computer and adaptive computer technologies for all cegeps. Only data for the 37 cegeps which participants represented are used; thus, it should be noted that figures for the 5 French cegeps which reported that they had no students with disabilities are excluded, as are data from the 1 English and 4 French cegeps which did have students with disabilities but declined to participate. Data for the distance education unit of the Cegep de Rosemont (Centre collégial de formation a distance) are also excluded because most questions of interest are not applicable to a college with no physical "campus." As a check on participants' responses concerning total enrollments we also obtained total enrollment data for each cegep was also obtained from the Ministry of Education web page (Ministère de l'éducation, 2000), which provided projections for 1999.

Participants. Participants responded to the following 2 questions: "Approximately how many students with all types of disabilities, documented or not, including learning disabilities, are enrolled at your institution?" and "Approximately what is the total student enrolment at your institution? (This includes students with and without disabilities and refers to the same campus(es) as the previous question.)." Only those who indicated that they had students with disabilities participated in the study with one exception: one individual indicated that although there were no students at the cegep currently, there had been several students the year before, and s/he was expecting students next year. Given the circumstances, data from this individual were retained in the data set.

AQEHPS. A second source of data is the report prepared by the Association québécoise des étudiants ayant des incapacités au postsecondaire. This report (AQEHPS, 1999) contains enrolment statistics, both of students with and without disabilities for 1998 for all public cegeps. The definition of students with disabilities used in the AQEHPS study is as follows.

> *"Par «étudiants ayant des incapacités», nous entendons toute personne ayant des incapacités qui poursuit des études postsecondaires, qui s'est identifiée et qui a complété un plan d'intervention auprès du service d'intégration des étudiants ayant des incapacités d'un établissement postsecondaire au Québec."*

"Official" data. The third data source is based on official figures for 1999 provided by the 3 "centres d'accueil:" by the Service d'Aide à l'Intégration Des Élèves (SAIDE) at Cégep du Vieux Montréal (Senécal, 2000), by Le Services aux étudiants handicapés du Cégep de Sainte-Foy (Juhel, 2000), and by Alice Havel of Dawson College (personal communication, April, 2000). These official figures represent the number of students for whom an individualized education plan (IEP/IIP) had been submitted and approved, and for whom services are officially provided by the cegeps.

Proportion Of Students With Disabilities

The data indicate that there are great discrepancies among cegeps in the percentage of students with disabilities (range 0% to 5.71%). To better understand the reasons for this we examined variables related to the proportion of students with disabilities in a variety of ways.

Summary data on student enrolments at participants' institutions and percentages of students with disabilities based on the 3 data sources are available in Table 3.02. Overall, the findings show that the average total enrolment at the participating cegeps was approximately 3500 (standard deviation approximately = 2000, range approximately = 700 to 8,000). Information concerning the percentage of students with disabilities on campus show that the mean percentage of students with disabilities was approximately 1/2 of 1% (i.e., 5 per 1000).

See Table 3.03 in the Appendix

Scores in Table 3.03 show that the average number of students with disabilities at participating cegeps ranges from a low of 7 students per cegep ("Official" data) to a high of 22 (Participants' data), with the AQEHPS mean of 14 in between. The average percentage of students with disabilities ranges from an "Official" low of .18% (i.e., less than 2 per 1000 students) to a high of .57% (i.e., slightly more than 5 per 1000 students) based on Participants' responses, with the AQEHPS mean of .30% again somewhere in between. Figures 3.01, 3.02, and 3.03 illustrate the findings.

See Figures 3.01, 3.02, and 3.03 in the Appendix

Means in Table 3.03 and inferential statistical tests indicate no significant difference between the total enrollments based on AQEHPS and Participants' data, $t(35)=.223$, $p>.05$. However, the 3 data sets differ significantly both on the number, $F(2,70)=4.84$, $p<.05$, and the percentage of students with disabilities, $F(2,70)=4.47$, $p<.05$. Means in Table 3.03 and post hoc tests with alpha set to .05 indicate that the "Official" data set shows significantly lower scores than either the AQEHPS or the Participant data sets for both number and percentage of students with disabilities. Although the AQEHPS data are always lower than Participants' data, the differences between scores are not significantly different.

A Pearson product-moment correlation indicates that the total enrollment figures provided by AQEHPS and by Participants were very highly and significantly related, $r(34) = .95$, $p<.001$. This is also true of correlations between AQEHPS and Ministry of Education $r(34) = .98$, $p<.001$, data and between Participants' and Ministry of Education data, $r(34) = .94$, $p<.001$. To simplify presentation of the results, unless otherwise noted, total cegep enrollments provided by the Participants are used in most analyses.

Data presented in Table 3.04 shows that the number of students with disabilities provided by the 3 data sources are also highly and significantly correlated. Given the very small numbers, it is not surprising that the coefficients are somewhat lower for the percentage of students with disabilities. Nevertheless, the correlations between the "Official" percentages and those based on both alternate data sources are significant.

See Table 3.04 in the Appendix

Is The Size Of The Cegep Related To The Percentage Of Students With Disabilities?

Because of substantial differences in total enrollments we wanted to find out whether institution size was related to the percentage of students with disabilities. To explore this possibility we correlated the percentage of students with disabilities with the total enrollment of the institution for the 31 participating French colleges. English cegeps were excluded from this analysis to avoid confounding language with institution size. Pearson product-moment correlation coefficients indicate no significant relationships between total enrollment and the percentage of students with disabilities, $r(30)=.164$ $p>.05$ (AQEHPS), $r(31)=.006$, $p>.05$ (Participants), $r(31)=.097$, $p>.05$ ("Official"). Thus, the size of a cegep is not related to the percentage of students with disabilities enrolled.

Is The Language Of The Cegep Related To The Percentage Of Students With Disabilities?

It was also possible that French and English institutions have different percentages of students with disabilities. This is especially likely as students with learning disabilities, who typically make up about 1/3 of English institutions' populations of students with disabilities, are not officially recognized as having a disability by most French cegeps. To evaluate this possibility we examined scores in English and French cegeps for all 3 data sets. Because there are only 4 participating English cegeps, statistical tests were not appropriate.

Data in Tables 3.05, 3.06, and 3.07 present the details for each of the 3 data sources. It can be seen in these tables that total enrollments in English cegeps (approximately 5700) are substantially higher than in French cegeps (approximately 3200), with the mean for English cegeps being almost twice the size of the mean for French cegeps. Thus, it is not surprising that English cegeps have more students with disabilities. What is surprising, however, is the magnitude of the difference, with English cegeps having between 4 to 8 times as many students with disabilities as the French cegeps.

See Tables 3.05, 3.06, and 3.07 in the Appendix

To explore the differences further we carried out an additional series of tests to remove 2 sources of confound. First, learning disabilities may not be recognized as a disability in French cegeps. Therefore, we reduced the number of students with disabilities at English cegeps by 1/3, the approximate proportion of students with learning disabilities in most North American postsecondary educational institutions (cf., Horn & Berktold, 1999). The impact of this can be seen in Tables 3.05 and 3.06 (we did not carry out this reduction for "Official" data, since learning disabilities are not counted in the "Official" data). This manipulation diminished the discrepancies somewhat. Nevertheless, the data indicate that there continue to be between 3 and 5 times as many students with disabilities in English than in French cegeps. The percentages of students with disabilities figures reflect these findings. So the presence of learning disabilities in English cegeps does not account for the discrepancy in the percentage of students with disabilities enrolled in English and French cegeps.

A second potential confound involved the 3 largest central "centre d'accueil" cegeps in the data set. These cegeps have been authorized, and funded, to ensure that disability related services are provided in all of the cegeps. Of special interest is the fact that that it is these cegeps that house the computer equipment banks (parcs mobiles des appareils) for the whole cegep system. Therefore, we removed data from Dawson College (on the English side) and from Cégep de Ste-Foy and Cégep du Vieux Montréal (on the French side), and examined scores again. This resulted in no change from the previous examination, and there were still 3 to 5 times as many students with disabilities in English than in French cegeps. In addition, it can be seen in Tables 3.05, 3.06, and 3.07 that even removing both students with learning disabilities as well as the 3 "centres d'accueil" failed to bring English and French numbers into line. So the inclusion of "centres d'accueil" does not account for the discrepancy in the percentage of students with disabilities enrolled in English and French cegeps.

Location of cegeps. Another possibility concerned the urban vs. rural location of cegeps. Only one campus of one English cegep is located in the Regions, while more than half of the participating French cegeps are located there. Therefore, we examined similarities and differences between English (n=4) and French (n=14) City cegeps and between City and Regions French cegeps. Because there are only 4 English cegeps in this data set, statistical tests were not made on City cegeps. In the case of French cegeps, however, a series of independent t-test were carried out based on the 3 data sets. Means and test results for these analyses are available in Table 3.08.

See Table 3.08 in the Appendix

French cegeps: City vs. Regions. Data and test results in Table 3.08 indicate that French cegeps in the Cities have significantly higher total enrollments than French cegeps from the Regions, $t(30)=3.60$, $p<.001$, for AQEHPS data and, $t(31)=4.46$, $p<.001$, for Participants' data. There were also differences, although less substantial, in the number of students with disabilities, $t(30)=2.53$, $p<.05$, (AQEHPS), $t(31)=1.80$, $p<.10$, (Participants), $t(31)=3.28$, $p<.01$, ("Official"). When it came to the percentage of students with disabilities, however, although means in all data sets indicated a larger percentage of students with disabilities in City cegeps, the differences were not significant.

City cegeps: English vs. French City cegeps. Means in 3.08 indicate that English and French City cegeps differ in a variety of ways. First, English cegeps are somewhat larger than French cegeps (M = approximately 5800 vs. 4500, respectively). They also have substantially larger numbers of students with disabilities: between 2 and 5 times more. Thus, it was not surprising that the percentage of students with disabilities was also substantially greater in the English cegeps, ranging from 1-1/2 times as many ("Official" data) to 4 times greater (Participant data). It can be seen in the Table that controlling for learning disabilities in the English cegeps by reducing the number of students with disabilities in the English cegeps (Participant data) does not alter the basic pattern of results.

Institutions With And Without Computer And Adaptive Computer Technologies On Campus For Students With Disabilities

Of the 45 non-distance education respondents, 34 (76%) indicated that they had equipment for students with disabilities and 11 (24%) indicated that they did not. 5 of the 6 respondents from the English institutions (83%) and 29 of the 39 respondents from the French institutions (74%) indicated having equipment for students with disabilities on campus. The Chi Square test indicates that the difference in proportions between English and French institutions is not significant, $X^2(1)=.227$, $p>.05$.

To ascertain whether institutions which did and did not have computer equipment for students with disabilities on campus differed in enrollment, we conducted a series of independent t-tests on enrollment statistics. Although means in Table 3.09 suggest that the 34 institutions with equipment were larger, had more students with disabilities, and had a larger proportion of students with disabilities than the 11 which do not have equipment, the t-tests on these variables were not significant. Given the enormous standard deviations, this is not surprising.

See Table 3.09 in the Appendix

Only 3 colleges indicated that they had a multidisciplinary advisory/steering committee which deals with the accessibility of computer technologies for students with disabilities. All 3 had administrators and the disability service provider or someone from his/her office as members. Two had a faculty member, and 1 had staff from computer services. None had student members, either with or without disabilities.

The priority accorded to computer related services was moderate, with a mean of 2.22 (SD = .89) on a 4-point scale where 1 indicates very high priority, 2 indicates high priority, 3 indicates low priority, and 4 indicates very low priority). Institutions with and without computer technologies on campus did not differ significantly, t(42)= .87, p>.05.

Provincial/regional loan programs. Of the 34 institutions which indicated that they had computer technologies on campus for their students, 27 indicated that a provincial/regional loan program supplied some of the computer and/or adaptive computer technologies. Mean response to the question which inquired about the adequacy of the resources provided by the loan program in meeting the needs of students with disabilities was 5.05 (SD = 1.33) on a 6-point scale, indicating considerate satisfaction. Indeed, less than 10% of respondents indicated that the equipment provided failed to meet students' needs.

"Actual situation." Comparisons of colleges with and without computers on campus for students with disabilities on "actual situation" and personal factors variables are presented in Table 3.10. These show that only 4 of the 14 comparisons are significant. After a Bonferroni correction to the alpha level, only one comparison remains significant. This shows that individuals who provide disability related services to students at institutions with equipment are significantly more knowledgeable about computers and adaptive computer technologies than those at colleges where there are no such technologies. Surprisingly, the t-test comparing ratings made by participants at campuses with (M=4.16, SD = 1.53) and without (M=4.60, SD = 1.52) computers on campus about how well, overall, students' computer related needs were met did not differ significantly t(35)=.61, p>.05.

See Table 3.10 in the Appendix

Correlates of Good Institutional Computer and adaptive computer Technologies

Overall, the data indicate that the 37 participants who expressed an opinion felt that the computer related needs of students were moderately well met at their institutions (mean = 4.22 on a 6-point scale, SD = 1.51, range 1-6, median = 5). The remaining participants either failed to answer (N=2) or indicated that this topic was not applicable to their institution (N=7).

To explore institutional factors important in adequately meeting the computer related needs of students we computed a series of Pearson product-moment correlation coefficients. The results, presented in Table 3.11 show that the following are important.

Funding for the institution's adaptive computer technologies

Numerous aspects of access to adaptive computer technologies, including:

- computer technologies up-to-date
- availability in specialized labs/centres
- availability in mainstream computer labs
- off-campus loan program
- training for students on adaptive computer technologies
- physical space available for computer technologies

Enough adapted computers with internet access

Various aspects of support for adaptive computer technologies on campus, including
- technical support
- computer support people can service adaptive computer technologies
- advisory/steering committee deals with computer accessibility
- specialist in adaptive computer technologies on campus

Aspects related to faculty, including:
- computer-based teaching materials used by professors accessible
- faculty trained in adaptive computer technologies

In addition, how knowledgeable the individual who provides services to students with disabilities was about adaptive computer technologies was also important.

See Table 3.11 in the Appendix

It can be seen in Table 3.12 that neither the size of the institution, nor the number or proportion of students with disabilities was related significantly to the adequacy of meeting students' computer and adaptive computer technology needs.

See Table 3.12 in the Appendix

Characteristics Of Individuals Who Provide Disability Related Services To Students With Disabilities

Sex distribution for individuals responsible for providing services to cegep students with disabilities indicate an even breakdown: approximately half of the service providers are female (n=22) and half male (n=24). Participants had an average of 8 years of experience working with students with disabilities (both the mean and the median were 8, with the mode being 5). However, the range was less than 1 year to 24 years. Participants indicated that they were not especially knowledgeable about adaptive computer technologies: the mean score was 3.00 on a 6-point scale, with higher scores indicating being more knowledgeable. Indeed, 59% of participants' answers indicated that they were not very knowledgeable, with only 9% indicating that they were reasonably expert. Additional details about sample characteristics are available in Table 3.01.

Aspects of Computer Technologies at Colleges

"Actual situation." Respondents' scores, presented in Table 3.13, indicate a mean of 3.73 on a 6-point scale on a question about the adequacy of funding for the institution's computer technologies, with higher scores indicating more favorable responses. In fact, 24% of respondents strongly disagreed with the statement that the level of funding at their institution for computer and adaptive computer technologies was adequate in meeting students' needs, with an additional 10% moderately disagreeing, 7% slightly disagreed. Only a little more than half of the respondents indicated that funding was adequate.

See Table 3.13 in the Appendix

Access to adaptive computer technologies. The Table also shows that of the factors related to access, the hours of access to computers, the physical space available for computer technologies, their availability on campus and the extent to which they were up-to-date were reasonably good (scores greater than 4 on a 6-point scale). The adequacy of the institution's off-campus loan program and training for students on adaptive computer technologies were seen as less adequate.

Internet/library and adaptive computer technologies. When it came to internet and library access issues, the data in Table 3.13 indicate that there are sufficient adapted computers with internet access and that the library's computers are generally accessible according to our participants. Internet based distance education, however, was seen as inadequate in meeting the needs of students with disabilities.

Support for adaptive computer technologies. It can also be seen in Table 3.13 that the only favorable aspect of support for adaptive computer technologies was the administration's response. All other aspects of support were seen as somewhat or very problematic. For example, available technical support and ability of computer support staff to service adapted computer technologies had ratings between 3 and 4, while opportunities for employees to learn about adaptive technologies, the availability of a specialist in adaptive computer technologies on campus, and the degree to which individuals who provide services to students with disabilities are consulted when computer infrastructure decisions are made were seen as inadequate in meeting the needs of students with disabilities. As noted earlier, only 3 cegeps had an advisory/steering committee that deals with computer accessibility.

Faculty and computer accessibility. Table 3.13 also shows that while the computer-based teaching materials used by professors are generally accessible according to the participants, when faculty are trained to use computer technologies in their courses, making their courses accessible to students with disabilities is rarely part of the curriculum.

Outside the institution factors. As for factors that pertained to variables outside the institution, it can be seen in Table 3.13 that disability service providers generally agreed that outside agencies provide students with appropriate equipment, although they were somewhat less positive about the training provided to students by these agencies.

"Desired situation." Table 3.13 also provides uncorrected means for the series of "desired situation" items ("It would be helpful if..."). However, it should be noted that these scores need to be interpreted in the context of the "actual situation" in each institution. That the "desired situation" scores need to be interpreted in the light of actual realities is made evident in Table 3.14. This shows that scores on half of the 12 "paired" items (i.e., paired "Actual" and "Desired" Situation items) are highly, significantly, and negatively correlated with each other (e.g., the less likely it is that computer support personnel can service adaptive computer technologies the more desirable it is for them to be able to do so). The Table also shows that 7 of 12 paired t-tests comparing "Actual" and "Desired" Situation mean scores were significant. Most of these show that "Desired" scores are significantly greater than "Actual" ones (e.g., the mean "Actual Situation" score for the item that deals with the presence of a specialist in adaptive computer on campus is 2.44 while the mean for the "Desired Situation" score is 4.74). The most pronounced differences were on items related to support for adaptive computer technologies, where all items were significantly different.

See Table 3.14 in the Appendix

What do individuals responsible for providing services to cegep students with disabilities who have poor "Actual Situations" feel would be most helpful for them? To answer this question we divided the sample, based on their responses to the "Actual" item, into those whose "Actual Situation" did or did not meet the needs of students with disabilities (i.e., score between 4 and 6 vs. score between 1 and 3). We then compared the scores of the 2 groups using independent t-tests.

Results presented in Table 3.15 indicate that there are differences which are significant or which approach significance on 5 of the 10 variables examined (on 2 variables the sample size in one of the cells was too low to conduct a t-test). These indicate that service providers whose existing conditions fail to meet the needs of students with disabilities wish to have the situation rectified. In particular, those whose current funding situation fails to meet the needs of students with disabilities want more funding for institution's adaptive computer technologies, those who have inadequate space for computer technologies wish to have more, those whose cegeps do not have sufficient equipment in computer labs want to have more equipment in labs, those whose computer support people do not take responsibility for adaptive technologies wish that this were the case, and those where professors' teaching materials are inaccessible to students with that these were more accessible.

See Table 3.15 in the Appendix

In addition to comparing the means, it is also interesting to examine the number of individuals who feel that the "Actual Situation" on specific variables meets students' needs. For example, more participants indicated that their current situation met students' needs when it came to access to adaptive computer technologies while the reverse was the case for items dealing with on campus technical support.

Wish list of personnel who provide services to students with disabilities. It can be seen in Table 3.16 that, overall, disability service providers wish that students were better equipped and prepared for the college experience. For example, the 3 highest ranked items express the wish for students to be able to get subsidized computer technologies for home use more easily; for students to have better access to computers off campus; and for students to be more knowledgeable computer users. The next group of highly ranked items relates to support services.

See Table 3.16 in the Appendix

When only the responses of participants who felt that their current situation does not meet the needs of students with disabilities are considered, the top ranked item continues to be the wish for students to get subsidized technologies for home use more easily. This is followed by the wish for more adequate computer support services from those who look after the institution's computers. However, these individuals also indicated wanting more funding and physical space for equipment. Additional details are available in Table 3.16.

Discussion: Study 3

Presence Of Students With Disabilities on Campus

The data indicate that there are great discrepancies among cegeps in the reported percentages of students with disabilities (0% to 6%). Nevertheless, overall, the proportion of these students in the cegeps is very low (i.e., approximately 1/2%: 5 per 1000). This is significantly and substantially lower than the more than 5.5% for the rest of Canada – a 10 fold difference (Fichten, 2000). What is important to note is that the discrepancy exists when the data were obtained in exactly the same way and during the same time period. Our previous work also suggested that the mean for colleges in Québec is substantially lower than that in the rest of Canada (Fichten, Barile, & Asuncion, 1999a). In that investigation, however, the methods for calculating percentages in Québec and the rest of Canada differed slightly. In the Fichten (2000) data set this is not the case because data gathering in Québec and the rest of Canada were proceeding at the same time using the same method and questions.

Education system in Québec and the rest of Canada. To explain the huge discrepancy we examined – and rejected - four hypotheses related to demographic factors and nature of postsecondary education in Québec and the rest of Canada.

- Hypothesis 1: The reason for the discrepancy is that cegeps are more "academic" than community colleges in the rest of Canada (i.e., the 2 year "pre-university" cegep programs are the equivalent of the first year of university in most other provinces and the 3 year "career" programs contain a substantial academic component). In addition, attending a college in the rest of Canada is generally based on a choice between going to university or a college. Students attend a community college if they need to upgrade their skills, take a college program instead of a university program, or take university transfer credits when there is no university close by. Those who wish to attend university go straight into a university program. In Québec students must attend cegep if they wish to go to university. Although all of these differences are generally true, both our current data set (Fichten, 2000) as well as our previous results (Fichten, Barile, & Asuncion, 1999a) have shown that the discrepancies are also true at the university level, and that the "academic" orientation of cegeps does not account for the low numbers.

- Hypothesis 2: Another possibility was that Québec simply does not value education for its population the way other provinces do. This, hypothesis, too, was rejected because, if anything, Québec is slightly ahead of the rest of Canada in stressing education for its population. For example, according to Statistics Canada (2000a), in 1999 Québec accounted for 24% of the population. Yet, in 1996-97, the last year for which data are presented on the Statistics Canada web page, Québec accounted for 32% of full and part time college students Statistics Canada (2000b), and 28% of full and part time university students Statistics Canada (2000c).

- Hypothesis 3: Colleges outside Québec tend to be substantially larger than cegeps in Québec (Fichten, 2000). Larger institutions have more students with disabilities and, therefore, a more formalized approach to the delivery of disability related services to them. This includes a well established office for students with disabilities or the presence on campus of a person whose sole task is to provide disability related services. This is in contrast to smaller colleges where the individual who provides disability related services also has other responsibilities. With this comes a more formalized approach to registering and recognizing students with disabilities on campus. So, according to this hypothesis, individuals responsible for providing services to college students with disabilities in other provinces may have more sophisticated "accounting" systems for keeping records on students with disabilities and a more comprehensive view of what constitutes a "disability." This hypothesis, too, was rejected because, as noted earlier (AQEHPS, 1999, Fichten, Barile, & Asuncion, 1999a), the percentage of students with disabilities is substantially lower in Québec universities as well, even though these institutions tend to be larger than their Canadian counterparts (Fichten, 2000). Indeed, the low enrollment of students with disabilities in Québec postsecondary institutions has been lamented by a variety of sources in Québec (Allie & Hébert, 1998; AQEHPS, 1999; OPHQ, 1995).

- Hypothesis 4: The population of persons with disabilities in Québec is lower than the rest of Canada; therefore the discrepancy in student enrolments simply reflects the distribution in the general population. In 1991 the percentage of persons with disabilities in Québec was slightly lower (14%) than in the rest of Canada (18%) (Statistics Canada, 2000d, 2000e, 2000e). However, the magnitude of the difference is not comparable to the ten fold difference found for college students (Fichten, 2000).

Variables related to the proportion of students with disabilities in the cegeps. To better understand the reasons for the low enrolment of students with disabilities in the cegeps we examined a host of variables in our data set. Because of the different ways in which disabilities are defined, in the present investigation we used three sources: data provided by the participants, data provided in a published report carried out by the Association québécoise des étudiants ayant des incapacités au postsecondaire (AQEHPS, 1999), and "official" data provided by the 3 designated cegeps which serve as "centres d'accueil" which are responsible for administrative aspects of services and computer and adaptive computer technologies for eligible students with disabilities at all of the cegeps. The findings indicate that the method used in our previous studies (i.e., data provided by the participants: individuals responsible for providing services to students with disabilities) always yielded the highest scores. This was closely followed by data from the AQEHPS report. The "official" data always yielded substantially and significantly lower scores. To be consistent with our previous investigations, here we will be referring to data provided by the participants.

One possibility was that the differences are due to linguistic variables. As noted by others, there are numerous differences in the postsecondary education of Québec anglophones and francophones (cf. Butlin, 1999; Norris, 1999). Our findings indicate that although language is an important variable, as there is a larger proportion of students in English (approximately 1%) than in French cegeps (approximately 1/2%), even the proportion of students in English cegeps fails to approach the proportion in the rest of Canada, where our data indicate that the overall rate for English colleges is substantially greater (Fichten, 2000; Fichten, Barile, & Asuncion, 1999a). This leads us to conclude that it is not language that is the determining factor, but, rather, some other systemic differences in the ways of conceptualizing and dealing with individuals with disabilities in Québec and the rest of Canada (cf., Fougeyrollas, Cloutier, Bergeron, Coté, & St. Michel, 1998; Lemieux-Brassard, 2000).

Yet, there were important differences between English and French cegeps in enrolments, regardless of how a disability was defined or the source of the enrolment information. To investigate whether differences between English and French cegeps were due to other, non linguistic factors, we conducted a series of analyses. There was a chance that other variables, such as the size of the cegep, its location in big cities versus in small towns or the size of the institution itself were responsible for the differences obtained. Our data, however, show that this is not the case. Although there was a trend for cegeps in big cities to have larger cegeps and, thus, more students with disabilities, as well as a larger percentage of students with disabilities, these differences were very small and cannot account for the findings. This was made evident when we compared French and English cegeps in the cities. Although slightly smaller, the differences between English and French cegeps remained substantial.

Another possibility was that students with learning disabilities, who typically make up about 1/3 of English institutions' populations of students with disabilities, are not considered to have a disability in Québec. To evaluate this possibility we conducted a series of comparisons where we controlled for learning disabilities by subtracting 1/3 of the students with disabilities in English cegeps, as this is the proportion of students with disabilities who generally have a learning disability. Again, this mitigated the differences somewhat, but by no means diminished the large discrepancies.

We do not understand the reasons for the linguistic differences within Québec, as we have found that neither institution size, nor institution location are related significantly to the percentage of students with disabilities in the cegeps. Indeed, we found no significant correlations with the percentage of students with disabilities on any of the variables examined.

Another finding of note concerns the large and significant differences between the number of students actually receiving disability related services in the cegeps and the number for whom "official" recognition and funding exist. This is illustrated by the large, significant differences between the "official" statistics provided by the 3 "centres d'accueil" and both the data provided in the AQEHPS (1999) report as well as that obtained from our participants. Again, this cannot be explained by presence of students with learning disabilities in the English cegeps as we conducted a series of analyses where this was controlled for.

Estimates of the number of American postsecondary students with some disability have ranged from 5% to 11 % (Henderson, 1995, 1999; Horn & Berktold, 1999; Greene & Zimbler, 1989; Disabled students in postsecondary education, 1997). Two recent probability samples provided data on the number of students with disabilities in postsecondary education. The 1995-96 National Postsecondary Aid Study cited by Horn & Berktold, 1999) indicates that approximately 6% of 21,000 American university undergraduates surveyed indicated that they had a disability. A 1994 freshman survey conducted by the Cooperative Institutional Research Program studied 237,777 students attending 461 American universities and 4 and 2 year colleges (Henderson, 1995). The 1998 survey examined responses of freshmen at 469 American colleges and universities. In both the 1994 and 1998 surveys, approximately 9% of students report at least one disability (Henderson, 1995, 1999). Large scale US results also show that between 1996 and 1998, 72% of postsecondary educational institutions enrolled students with disabilities Lewis & Farris (1999). Almost all public 2 and 4 year institutions (98%), but only 63% of private 4 year institutions and 47% of private 2 year institutions enrolled students with disabilities. Moreover, large institutions were more likely to have students with disabilities than small ones. To the best of our knowledge, there are no recent Canadian surveys of either all incoming students or all students currently enrolled who report having a disability either at the college or university levels. Thus, our data, which were obtained from individuals responsible for providing services to postsecondary students with disabilities, may not be comparable to the American numbers. If, however, we assume that US and Canadian rates are similar, then our Canada-wide data (Fichten, Barile, & Asuncion, 1999a) suggest that between 2/3 and 3/4 of students with disabilities do not register with their institution. While this type of conceptualization suggests that the actual number of students with disabilities in the cegeps is actually larger, it would not erase the substantial differences between Québec and Canadian colleges.

The Actual Situation Of Computers On Cegep Campuses

The results indicate that most cegeps (76%) had some type of computer or adaptive computer technologies for students with disabilities on campus. It should be noted that this is a marked change from previous years. For example, Burgstahler's (1992, 1993) data, which were collected in 1991, showed that in the State of Washington, only 60% of institutions provided equipment for their students. There was no significant difference between English and French cegeps on this variable, or indeed, on any variables evaluated in this investigation. Nevertheless, it should be noted that consistent with population wide studies in Canada, whatever differences there were favored English cegeps (i.e., more extensive and broader based use of information, computer and adaptive computer technologies on English campuses). These differences, like their population counterparts, however, were neither substantial nor significant (Angus Reid Group, 2000; Labrèche, 2000; PricewaterhouseCoopers, 2000; Statistics Canada, 1999).

The main difference between the 76% of cegeps which had some type of computer or adaptive computer technologies for their students and the 24% that did not was size. Cegeps with equipment tended to be larger, to have more students with disabilities, and to have a larger percentage of students with disabilities. It should be noted, however, that none of these differences were significant.

It is also important to keep in mind that only 3 colleges indicated that they had a multidisciplinary advisory/steering committee which deals with the on campus accessibility of computer technologies for students with disabilities. All 3 had administrators and the disability service provider or someone from his/her office as members. But only 2 had a faculty member, and only 1 had staff from computer services. None had student members, either with or without disabilities. This is similar to American findings from 1991 (Burgstahler, 1992, 1993), where only about 1/3 of higher education institutions made decisions after formal broad-based consultation (i.e., intersectorial committees including students, computing services, audio-visual, the library, learning center, physical plant representatives, faculty, student affairs, and adaptive technologists). With the increased use of computer technologies in the delivery of postsecondary education, this is an important area where broader consultation will be needed. In the future, it will become necessary to ensure that course and department web pages are accessible, that WebCT or whatever web authoring tools are used to manage both distance education and campus based courses are accessible, that network versions of software are compatible with adaptive technologies, and that educational CD-ROMs and other software-based tutorials developed and purchased by the cegeps are accessible, etc.

In general, computer related services constituted a moderately important priority among the totality of services offered to students with disabilities by cegeps. In the future we expect this function to gain in importance as the cegeps proceed along the road to greater integration of computer technologies across the curriculum.

An important finding concerns the strong satisfaction expressed by virtually all service providers about the equipment and responsiveness of the centralized loan banks for computer technologies run by the 2 francophone centres d'accueil: Service d'Aide à l'Intégration Des Élèves (SAIDE - Cégep du Vieux Montréal) and le Services aux étudiants handicapés du Cégep de Sainte-Foy. The mean rating was an astonishing (5.05 on a 6-point scale), and only 10% of responses indicated any level of dissatisfaction with the computer loan banks. Clearly providing centralized computer related services in this manner is a good way to proceed given the small numbers of students with disabilities in many cegeps.

Meeting The Computer And Adaptive Computer Technology Needs Of Students With Disabilities: Actual And Desired Situations

Overall, the responses indicate that at this time the computer related needs of students with disabilities are moderately well met in the cegeps (mean rating was 4.22 on a 6-point scale). Surprisingly, how well students' computer related needs are met was not related to presence of computers on campus. This may reflect three things. It is possible that the students on campuses with no equipment do not need any specialized adaptive computer technologies because using computers on campus is not required by students' programs. Another possibility is that students are able to use the unadapted equipment available in the college's regular computer labs. The third possibility is that students have their own portable equipment which allows them to function well in the context of their on-campus activities.

We do not have any data bearing directly on this issue. Our findings do suggest, however, that it is a combination of all three possibilities that best explain this anomaly. First, most students with disabilities are enrolled in social sciences and creative arts programs, which do not yet use computer technologies in a sophisticated way. Second, data in Study 2 indicate that only about 1/3 of students need adaptations to use a computer effectively. Third, Study 2 data suggest that only a small proportion of cegep students with disabilities have their own portable equipment (22% of the 76 students in Study 2). In addition, service providers do not believe that students are especially well equipped with their own portable adaptive computer technologies. For example, individuals responsible for providing services to these students indicated that they wished that students were able to get subsidized computer technologies for home use more easily and that students needed better access to computers off campus. This is consistent with the data from Studies 1 and 2 which indicate that there were serious problems noted concerning lengthy delays, limited choice, poor provisions for upgrading, inadequate training, restrictive admission criteria, and exclusion of students with certain disabilities as well as of students with "less severe" major functional limitations.

In general, the responses indicated that access to needed computer technologies on campus was reasonably good. This includes library and internet access. For example, issues such as how up-to-date the college's equipment is, the hours of access to computers for students with disabilities, physical space to house computer equipment, and the availability of computer and adaptive computer technologies to students were all rated by service providers as meeting the needs of students with disabilities moderately well (i.e., score greater than 4 on a 6-point scale). Participants also felt that the college administrations were supportive of the computer related concerns of students with disabilities, although this support may not extend to good funding; a common comment was "they are certainly supportive in words, but in terms of being proactive, and putting money where their mouths were, that was a totally different issue." For example, the rating concerning the adequacy of the current state of funding received a score below 4 and additional funding for computer and adaptive computer technologies was a highly rated item on service providers' wish lists.

Ratings related to support for computer and adaptive computer technologies for students with disabilities were generally poor. Problems were noted concerning technical support and the inability of technical support personnel to service adaptive computer technologies. Also, cegep service providers expressed a need for an adaptive computer specialist as well as for a broad based advisory committee to deal with computer accessibility issues. What makes these complaints especially important is that ratings on these items were significantly correlated with the overall ability of the cegeps' computer and adaptive computer technologies to meet the needs of students with disabilities on campus. In addition, ratings concerning lack of consultation when campus-wide computer related decisions are made and lack of opportunities to learn more about computer technologies that can assist students with disabilities were also poor.

Individuals responsible for providing services to cegep students with disabilities noted that professors' computer related materials were reasonably accessible to students. This likely reflected the relatively low levels of computer use (mainly word processing) in arts and social science programs which enroll large proportions of students with disabilities. They also indicated, however, that in training programs aimed at promoting the educational use of computer technologies by faculty, issues related to accessibility for students with disabilities are simply not discussed. An anecdotal example that highlights this is that one of us was told, while taking a seminar on how to develop course related web pages, that students who are blind cannot use a computer because they cannot see the screen.

The findings also indicate that a variety of factors are important in determining the overall adequacy of a cegep's ability to meet the computer related needs of students with disabilities: good funding for computer and adaptive computer technologies, good access to computers and adaptive computer technologies, accessible internet access and available on campus technical support, faculty making their teaching materials accessible to students with disabilities, and the adaptive computer expertise of the service provider.

When it came to evaluating the role of outside agencies that provide students with computer and adaptive computer technologies for off-campus use, service providers indicated that the equipment provided by these agencies is appropriate. However, they also noted that it would be helpful if it were easier for students to obtain subsidized computer and adaptive computer technologies and that these organizations did not provide sufficient training on the equipment.

Examination of the wish lists of individuals responsible for providing services to cegep students with disabilities showed, not surprisingly, that desired items followed low ratings concerning the cegep's actual situation. In particular, disability service providers indicated that their jobs would be easier to carry out if students were better equipped and prepared for the computer related aspects of the college experience. For example, the 3 most highly ranked items express the wish for students to be able to get subsidized computer technologies for home use more easily, for students to have better access to computers off campus, and for students to be more knowledgeable computer users. The next group of highly ranked items relates to the support services and includes having the cegep's computer support people take more responsibility for adaptive computer equipment, the availability of an adaptive computer specialist, as well as better funding for computer related activities and more space for equipment. They also wanted to be consulted when computer related campus wide infrastructure decisions are made and they wanted professional development time to learn about adaptive computer technologies.

GENERAL DISCUSSION, IMPLICATIONS AND CONCLUSIONS

Limitations Of The Present Research

As noted in the discussion sections of the three studies, each investigation had certain limitations. On the negative side, a general problem is that, given the topic of our research, we expect that individuals who are knowledgeable about computers were more likely to participate, and, thus are over-represented in Studies 1 and 2. In addition, calculation of the return rate in Study 2 was problematic. Also, in Study 1 we had to supplement focus group data with individual interviews. On the positive side, we deliberately used several different methods to obtain data: focus groups, structured interviews, and broadly distributed questionnaires. Thus, we benefited from the global perspective provided by the rich qualitative data obtained in the focus groups of Study 1. These were augmented by the quantitative evaluations and larger samples in Studies 2 and 3. We took precautions to ensure that people with all types of disabilities had the opportunity to participate. Therefore, we used alternate formats and methods of communication (e.g., interpreters for students with hearing impairments in Study 1, alternate formats for questionnaires in Study 2, e-mail and Bell Relay for telephone interviews in Study 3). All studies favored the easy participation of both anglophones and francophones as every stage of the research was conducted in both languages. The data gathering involved almost 200 participants representing more than 40 colleges and a large variety of disciplines, programs and geographical locations within Québec. Such "representativeness" is unprecedented in empirical research on cegep education and students with disabilities. Nevertheless, the limitations are important and need to be considered when interpreting the findings.

Overall Impressions And Recommendations

Despite these limitations and the widely different methodologies used in the three studies of this investigation, the findings converge on a variety of important points. First, it is evident that computer and adaptive computer technologies can either act as obstacles or facilitators for cegep students with disabilities. In all stages of the research, the perceived advantages of computer technologies far outweighed the disadvantages. Cegep students with disabilities in both the English and French cegeps appear to have a high level of computer and internet use and literacy. In fact, most participants in the research indicated that more, more up-to-date, better, and more user friendly technologies are needed both by students with disabilities as well as by institutions having students with disabilities. What is also readily apparent from the data is that there are a variety of problems and issues regarding the availability of such technologies which need to be addressed. These include:

- **Government subsidy programs providing loans and grants for purchasing computer technologies for students with disabilities:** more inclusive admissibility criteria, better funding and support for upgrades, fewer delays, and improved information dissemination concerning available programs
- **Adaptive computer technologies:** enhanced training opportunities for students as well as for individuals responsible for providing services to cegep students with disabilities; more available information about adaptive technologies
- **Enrolment of students with disabilities in the cegeps:** Recruiting more students with disabilities into the cegeps and finding out reasons for low enrolments
- **Linguistic concerns:** equalise linguistic accessibility through development of French resource materials on how to make computer and learning technologies accessible to students with disabilities
- **Ensuring accessibility through universal design**: pedagogical materials produced in the cegeps need to be accessible; campus-wide computer infrastructure improvement decisions must be inclusive of the needs and concerns of students with disabilities

It is also clear from the data that the educational use of computer technologies and the integration of computer technologies into the curriculum in the cegeps is still at an early stage. This seems to be especially true in social science programs, which currently have the majority of students with disabilities. Thus, the data reflect the situation as it currently stands. Our findings do not reflect the impact of forthcoming changes in the educational uses of computers in the cegeps. Some of these are discussed in Cuneo's (2000) recent report to Industry Canada. Based on research carried out in 1999-2000, the report concerns a Canada-wide study of both English and French postsecondary educational institutions. The findings indicate that, as is already true in the United States, in the near future Canadian colleges and universities will be placing greater emphasis on online courses and instructor training in computer based teaching technologies. We would like to ensure that information on computer accessibility for students with disabilities is included in any training on how to use these technologies.

Our previous research on universities (Fichten, Barile, & Asuncion, 1999a) has sensitised us to problems which can arise in heavily computerised educational environments when students take courses in pure and applied sciences and engineering programs. We attempt to project into the future when making recommendations for modifications to current practice.

Experience from educational institutions where there is innovative integration of computer technologies into the curriculum has shown that unless concerns of students with disabilities are included in the planning from the beginning, students who need adaptations to use a computer effectively can wind up doing "replacement work" because courses that include computer based activities in class do not have computers with the necessary adaptations to make them accessible. In courses with a computer lab component, because they cannot independently access the software, students who are blind often sit doing nothing while the rest of the class work through computer-based statistics or biology tutorials. Alternately, they require a sighted partner to assist them. Students with other impairments have had similar problems (e.g., internet courses which use a mouse for students with manual dexterity impairments). This type of problem will be more common in the near future due to the increasing use of computer technologies in the classroom. Lack of access to compulsory computer mediated learning activities will create additional obstacles - and inequity. Such lack of access can prevent students from being evaluated on an equal footing with their nondisabled peers, while denying them the opportunity to acquire the technology literacy skills that are an important part of the postsecondary learning experience.

The history of people with disabilities in Quebec has taught us the lesson that if we do not integrate new ways of learning to accommodate students with disabilities from the outset, we not only pay a high economic price but we also compromise human rights (cf., Leblanc, 1999).

Findings Summarized

Our findings show that the vast majority of cegep students with disabilities can and do use computer technologies and the internet to carry out their school work. The number and nature of the advantages that computer technologies had for participants reflect Roulstone's (1998) view that using computer technologies is a way to enhance access and break down barriers and obstacles. The findings also demonstrate how critical computers are to the success of students with disabilities. The issue is not simply one of access to information. Rather, technological tools are seen by many as a prerequisite for performing many activities of daily living in the near future. This includes employment in the knowledge based-economy. Providing students with the appropriate tools is a prerequisite to getting there.

How Computers Are Used In The Cegeps

- While there is substantial interest in using computer technologies in the classroom, progress in this area in the cegeps is only in the initial phases of development
- There is wide variation among professors in the extent to which they use computers; discrepancies seem to be related to program and discipline, with heavier use, generally, in the sciences and engineering technologies than in creative arts or the social sciences
- When computers are used, the most popular applications are word processing (Word), spreadsheets (Excel), PowerPoint, and the internet, with students being expected to word process assignments and to carry out research using the internet
- Professors indicated that, at present, the cegeps have limited equipment available both to professors and to students: computer labs are crowded, opportunities to hold classes in computer labs are few, equipment for classroom demonstrations is problematic, classroom demonstrations have multiple technical difficulties, and technical support for faculty efforts at integrating computer technologies is inadequate
- A common educational use of computers by professors is to put course outlines and course notes on a web page
- Professors are concerned about the cost of upgrading software and hardware in computer labs given the short usable life of computers - between 3 and 5 years
- Although some professors attempt to use up-to-date instructional design principles and sound pedagogical practices when integrating computers into their courses, this is not typical or systematic
- Professors are concerned that there will be an overemphasis on technology and an underemphasis on pedagogy
- In the next 5 years professors generally foresee more of the same, except faster, better, and cheaper technologies - there was little mention of interactivity, communities of learners, construction of knowledge, distributed learning, or other current concepts in education
- Some professors noted that pedagogical practices which are useful for students with disabilities are good pedagogical practices in general (e.g., being more organized with lecture notes, spelling names and difficult words when writing these)

Representation Of Students With Disabilities In The Cegeps

- In comparison with colleges in the rest of Canada, cegeps have substantially and significantly smaller proportions of students with disabilities (i.e., a 10 fold difference: 1/2% in Québec compared to 5-1/2% in the rest of Canada) - this was true of both French and English cegeps, although English cegeps had a slightly larger proportion of students with disabilities than French colleges
- There were substantial and significant differences between the number of students with disabilities actually receiving services in the cegeps and the numbers that were "officially" recognized by the provincial Ministry of Education - three times as many students were actually receiving services compared to the numbers which appeared on the "official" lists that determine funding for the cegeps
- Discrepancies between actual and "official" numbers occurred in both French and English cegeps and cannot be explained by the presence of students with learning disabilities in English cegeps
- There is growing concern expressed by disability service providers in the cegeps about the need to accommodate the computer related needs of students with learning disabilities; although the need is expressed more frequently in the English sector, it is increasingly evident in the French sector
- Key problems for both students and cegep service providers include: the high cost of computer technologies; network, hardware and software compatibility problems created by popular adaptive computer technologies; poor training opportunities both for students and service providers; failure to inform professors about topics related to how to make computer-based teaching components accessible to students with disabilities during inservice faculty training programs; inadequate funding of computer support services for students with disabilities to meet future needs

Characteristics Of Cegep Students With Disabilities

- Almost 2/3 of students were enrolled in social sciences - either pre-university or careers programs, with less than 1/4 enrolled in science and engineering programs; less than 10% of students were enrolled in creative arts
- The rank order of students' impairments/disabilities in the large Study 2 sample is as follows: mobility impairment, visual impairment, hearing impairment, problems using hands or arms, learning disability (26% in English and 13% in French cegeps), speech impairment, medical impairment, psychiatric impairment
- More than half of the sample (55%) had multiple impairments; the mean number of impairments was 1.71 per student
- Half of the student participants indicated that their financial situation was not adequate in meeting their needs
- The mean age of students with disabilities is substantially higher than that of nondisabled students at the cegep level: the mean was 23

Computer Use By Students With Disabilities

- Virtually all students with disabilities in our studies (more than 90%) use computers, mainly IBM compatibles, both at home and at school for an average of 9 hours per week
- The overwhelming majority (more than 80%) of both francophone and anglophone students use the internet, mainly for research and personal e-mail (about 2/3 of students use this at home and 2/3 at school) for an average of 6 hours per week in addition to time spent on a computer

- Reasons students do not use the internet are, in rank order: no access to a computer that is equipped to go on line, costs too much, available browsers and e-mail programs don't work well for them, ties up the phone line, some features of the Web are not accessible to them
- About 1/3 of students needed adaptations to use a computer effectively (e.g., software that enlarges what is on the screen, adapted mouse) - because of lack of availability and cost, not all of them used these
- There was a clear tendency to "cross-use technologies" (i.e., technologies intended for students with one type of disability used by students with a different disability)
- Within the variables investigated, both age and sex were only minimally associated with computer related views and experiences; where differences existed these favored younger students and males
- French cegeps in large cities and cegeps in the regions generally did not differ, but where they did, the differences in computer and internet availability, use and attitudes favored the city cegeps
- There were no significant differences in the proportion of computer users in English and French cegeps; where slight differences existed, these favored students from English cegeps
- Students and individuals responsible for providing services to cegep students with disabilities generally learned to use computer technologies by themselves - students who used adaptive equipment learned the basics at rehabilitation centers and continued to learn on their own

Problems With Computers

- The most common problem noted by participants in all 3 studies is that computer technologies cost too much
- Other problems include: the need for continual upgrading, few opportunities for training on adaptive technologies, hardware and software compatibility problems, computer labs had little adaptive technology in them, both mainstream and specialized computer labs with adaptive equipment are generally overcrowded
- Lack of information about new developments and resources
- Inadequate time and resources for individuals responsible for providing services to cegep students with disabilities to learn about adaptive computer technologies; they learn on their own or from the students
- Recommendations to adaptive computer hardware and software companies were: provide student discounts, make adaptive hardware and software less expensive, provide grants to educational institutions to purchase equipment for student use, provide trial periods, ensure that advertising reaches students with disabilities, make products more user friendly
- Difficulties with hours of access to computer technologies at school, especially for students in the regions and users of adaptive computer technologies

Computer Related Services At Cegeps For Students With Disabilities

- Students with disabilities are generally enrolled in social science pre-university and career programs; computer use in courses in these disciplines is not yet extensive
- Cegep service providers indicate that, at present, computer related services are only a moderate priority for them; nevertheless, service providers indicated that they were experiencing problems with funding for computer related services
- Most cegeps (more than 3/4) had some type of computer or adaptive computer technologies for students with disabilities on campus; smaller cegeps and those with fewer students with disabilities are less likely to have computer technologies on campus for their students

- Service providers report that students often come to school with their own computer equipment, and that most of them generally need no further computer related services
- Computer related services for students with disabilities are not organized systematically - cegeps with fewer students typically proceed on a case by case basis - an approach which many service providers feel meets the current needs of students with disabilities
- Very few cegeps have multidisciplinary computer access committees and individuals responsible for providing services to cegep students with disabilities are rarely consulted when campus-wide computer and learning technology infrastructure decisions are made
- When they experience difficulties with students' computer related accommodations, professors generally ask for assistance either from the students themselves or from individuals providing services to students with disabilities
- The two centralized provincial loan banks which provide computer equipment and information to individual cegeps for on-campus use (run by the SAIDE at Cégep du Vieux Montréal and le Services aux étudiants handicapés du Cégep de Sainte-Foy) received excellent evaluations from the individuals responsible for providing services to cegep students with disabilities; these organizations are seen as an invaluable resource
- Most cegeps do not loan equipment to students for home use; those that do have had to resolve problems related to insurance and break-downs
- Instructor training in computer based teaching technologies do not involve modules on access related concerns of students with disabilities
- Many individuals providing services to students with disabilities in the cegeps are unfamiliar with adaptive computer technologies
- Knowledgeable service providers are self-taught: they learn on their own time by trying things out at home, learning from the students, checking out the web, calling on each other, etc. - there is no time or money for courses or conferences
- Some factors which are important to the overall adequacy of an institution in meeting the computer related needs of students with disabilities include: institutional funding, access to adaptive computer technologies, internet access, technical support, factors related to faculty, and expertise of service providers
- service providers who do not have these resources available on campus wished for the following: having the cegep's computer technicians take more responsibility for adaptive computer equipment, availability of an adaptive computer specialist, better funding for computer related activities, more space for equipment, being consulted when computer related campus wide infrastructure decisions are made, and professional development time to learn about adaptive computer technologies

Computers For Off-Campus Use

- The high costs related to acquiring, maintaining, and updating computer technologies were the most important and common issues noted by students (both computer users and non-users), individuals providing services to students with disabilities, as well as professors
- Computers used off campus were primarily purchased by students and their families; in spite of the finding that half of the student participants indicated that their financial situation was not adequate in meeting their needs
- Less than 1/3 of students used a government program to help them acquire computer technologies for home use - students with hearing impairments were especially unlikely to take advantage of a government program, whereas students who needed adaptations to use a computer efficiently, including students with visual impairments and those who use a wheelchair, were most likely to do so
- Many students and service providers are unaware of the existence of government subsidy and computer loan programs for students with disabilities

- The usable life span of a computer is estimated around 3-5 years by professors - students with disabilities and cegep service providers were both concerned about problems students have in upgrading computers they use at home because some government subsidy programs do not provide upgrades
- Although government agencies and programs provided up-to-date equipment, there were serious problems noted with: lengthy delays, limited choice, poor provisions for upgrading, inadequate training, restrictive admission criteria, and exclusion of students with certain disabilities as well as of students with "less severe" major functional limitations
- Concern was expressed about the appropriateness of using parental income in the case of adult students with disabilities who live with their parents because of physical factors related to their disabilities - this problem is exacerbated because students with disabilities tend to be older than nondisabled cegeps students
- Students who had no computer at home wanted to have one; those with no portable equipment wanted this; those who needed adaptations and did not have these wanted adaptations; and students who had no internet access from home wanted access
- Individuals responsible for providing services to cegep students with disabilities would find their jobs easier to carry out if students were able to get subsidized computer technologies for home use more easily and if students were better trained on how to use these

Computer Technologies Used By Students With Disabilities

- The most popular computer technologies were sophisticated features already available in popular software or mainstream equipment (e.g., spelling and grammar checking, a scanner, a portable)
- Voice recognition (dictation) software and the availability of materials in electronic format (e.g., textbooks, course hand-outs) were also seen as especially useful - while such adaptations are likely to be useful for all students, for many students with disabilities such technologies are a necessity

Ensuring Access: How Do Students With Different Disabilities Use Computer Technologies?

Participants in the three studies indicated the types of computer and/or adaptive computer technologies used by students with different disabilities as well as their purpose. Loosely based on the findings, the descriptions that follow summarize the special considerations related to the types of equipment often used by students with specific impairments/disabilities. These are by no means exhaustive but are offered to provide an idea of some of the possibilities available for these students to gain access to computer technologies.

Students who are blind. These students, although relatively few in number, use a large variety of sophisticated technologies to assist them in using computers effectively. The key to understanding how students who are blind use computers is to recognize that once information is available as electronic text, it can be accessed. From there, synthesized speech or Braille output devices can be used to read the material. Most students use software that reads text on the screen; other more sophisticated software can "read" icons, tabs, and menu bars as well (called screen readers). Some of these have been developed specifically to give access to Windows-based applications. A note of caution. This development is ongoing, and not all Windows-based software is readily accessible at this time. Therefore, many students still opt for DOS and sophisticated DOS based word processing programs such as WordPerfect 5.1 are the favorite for many students. By using a scanner and optical character recognition (OCR), a printed page can be converted into electronic text. At this time, mathematical symbols, pictures, charts, graphs and complex tables remain problematic, both in print and electronic formats. In keeping with the text based approach, students who are blind reported using text based web browsers and e-mail as well as text based math software (e.g., Maple). Laptops with screen readers and portable devices with voice or Braille output can be used to take notes.

Students who have low vision. These students can either use software that enlarges the size of visual elements or they can use synthesized speech to read electronic text files (similar to their blind peers). Many use both technologies. Unlike students who are blind, these students generally use Windows or Macintosh operating systems rather than DOS. Large screen monitors (e.g., 21 inch), with or without software that enlarges what is on the screen, are also helpful. These can be enhanced with visors and masks to cut glare. Students can control the display through readily available and built-in features of popular software (e.g., zoom, font size, font and background color) to enhance contrast and visibility. These students, too, use scanners to enlarge printed materials or to convert printed material into electronic text. Electronic dictionaries and encyclopedias, a laptop (with magnification or synthesized speech), as well as a portable note taking device with a QWERTY keyboard and speech output were also reported as useful.

Students with hearing impairments. A variety of electronic dictionaries/encyclopedias as well as both mainstream (e.g., spell check and grammar check) and specialized writing aids (e.g., word prediction software - described below under learning disabilities) can be helpful for these students. They can also use built-in accessibility features of Windows and Macintosh computers such as visual flash (instead of sounds). When accessing video and audio clips, these students can make use of subtitles/captions where available. Also, many students use e-mail and chat programs rather than the telephone. Students can have difficulty looking down and taking notes while concentrating on the professor's face in order to lip read. This problem can be solved through a portable C-Note system (CNS, 2000) which consists of 2 joined laptops. This allows a hearing individual (a note taker) to type what the professor says; this is displayed on the student's screen. The student, in turn, can type a query to the instructor which will appear on the note taker's screen. The note taker can then ask the professor the student's question verbally. An additional benefit of the C-Note system is that the note taker can type questions and comments from classmates which the student may not be able to hear or lip read.

Students with speech/communication impairments. These students, too, often use e-mail and chat programs rather than the telephone. They can also use a portable, light weight note taker device to communicate with others in face-to-face contexts (e.g., AlphaSmart, 2000). For class presentations these students can use a word processor with a multimedia projector instead of speaking or have PowerPoint or other presentation materials projected onto a large screen.

Students with mobility and hand/arm impairments. A variety of ergonomic adaptations are likely to be used by these students. Software based keyboard adaptations include accessibility features such as sticky keys (built-in software to allow one keystroke use of keys that require Shift, Control, CapsLock, etc.), filter keys (to instruct the computer to ignore brief or repeated keystrokes or to slow key repeat rates), and mouse keys (allow mouse movements to be emulated by keystrokes). Both software and hardware adaptations can allow for one handed typing. Students can also use a keyguard (a plastic keyboard overlay to prevent hitting 2 keys at the same time), splints, wrist rests, as well as a variety of alternative mice (e.g., joystick type mouse, trackballs, touch pads, head or foot mice). Many students can benefit from dictation and voice control software (control of menus and toolbars by voice). Students can also use alternate input devices such as a mouth wand (chopstick like rod with a rubberized tip for typing using one's mouth), a sip and puff device (system to give computer commands by blowing or sucking through a straw-like device), or Morse input. Some of these students, too, can benefit from electronic text (no need to handle paper) as well as electronic dictionaries and encyclopedias. Thus, scanners with optical character recognition software can be useful for these students as well. Some students also use word prediction software to speed up their typing; this is described in the section on learning disabilities. Of course, portable devices such as a laptop or a portable note taking device can also be useful.

Students with a learning disability. These students can make use of software and hardware already described. For example, students who have problems reading because they skip or reverse letters and those who have difficulty reading left to right in a straight line can use software that reads what is on the screen. Equipment developed for students with low vision or for students who are blind can be used by students with difficulties reading. As was the case for students with visual impairments, scanning and optical character recognition can be used to convert printed materials to electronic text, which can then be read by the computer using synthesized speech. For students who have difficulty with cursive text, a laptop or portable note taking device can be useful. Some students who have difficulty with grammar and spelling may find dictation software such as Dragon Naturally Speaking or ViaVoice interesting. As was the case for students with low vision, magnification and the ability to control the display through built-in features of software (e.g., font size, highlight and background color) can be helpful, as can a large screen monitor. Students with problems related to organization can use mainstream document manager and scheduling programs. Of course, mainstream programs such as spelling and grammar check are also important, and word prediction software can be used (the student starts typing a word and several words which complete what the student has already typed pop up, allowing the student to choose rather than type the appropriate word). Electronic dictionaries and encyclopedias are also helpful. Specialized flow charting/concept mapping software may also be of interest. These students can also benefit from portable devices such as laptops or portable note taking devices which can upload files into a computer.

Trends in How Computer And/Or Adaptive Computer Technologies Are Used By Students With Disabilities

More than half of the students in our samples had two or more impairments/disabilities. This finding highlights the need for adapted work stations which can accommodate the needs of students with various disabilities at once. Multiple uses of adaptive technologies seems to be an important development, and the increasing number of accessibility features built into widely available mainstream products are of considerable interest to students with disabilities. Nevertheless, recent developments in sophisticated adaptive technologies have underscored the increasing importance of ensuring that different types of adaptive equipment be able to work together. This is an important issue because there are compatibility problems among various adaptive computer technologies. In particular, the video card requirements of magnification software, the heavy hardware and training demands of dictation programs, and compatibility problems between dictation and screen reading technologies pose difficulties. Compatibility with Windows NT is rapidly becoming a priority. In addition, despite such new trends and advances, there are still simple hardware complaints (which can readily be fixed) such as the location of on/off switches on monitors.

"Cross use" of computer technologies. Consistent with this trend is the "cross-use" of adaptive technologies by students with different disabilities (i.e., for students with one kind of impairment to use technologies intended for students with a different type of disability). An example is the use of software that reads aloud what is on the screen not only by students with visual impairments but also by those with other print-based disabilities, including some types of learning disabilities. Another example involves the growing use of voice recognition (dictation) software. This is used by students who have difficulty using the traditional QWERTY keyboard (e.g., students who are quadriplegic, students with only one arm, students with a variety of neuromuscular conditions) as well as by those with arthritis, repetitive motion injuries such as carpal tunnel syndrome, and those with certain learning disabilities. Use of large screen monitors and scanners with optical character recognition software provide additional instances of this trend.

Blurring between adaptive and mainstream technologies. We asked students in Study 2 what computer and/or adaptive computer technologies they considered could be useful in getting their work done. Overall, the rank order for students with all types of disabilities combined was as follows:

- A spell checker / grammar checker
- A scanner
- A portable note taking device
- Dictation software (voice recognition software that types what you say)
- Having material available in electronic format (e.g., books, hand-outs)
- A large screen monitor
- Other specialized software for learning disabilities (e.g., word prediction)
- Voice control software (you give voice commands like "file," "open," - e.g., VoicePad)
- A screen reader (software that reads what's on the screen)
- Software that enlarges what is on the screen
- Mouse adaptations (e.g., head mouse, track ball)
- Keyboard adaptations (e.g., "sticky keys")
- A Braille printer
- Braille translation software

It is evident from this list that what are generally considered mainstream technologies are, in fact, used as adaptive technologies by students with certain disabilities. For example, most people use spell checkers. For students with some learning disabilities this tool is used as an adaptive technology to help compensate for the disability. A scanner, which is also a popular mainstream product, has long been used with optical character recognition to convert printed pages into electronic text by students who are blind. Dictation software, such as Dragon and Via Voice, originally intended for professionals and executives, is now used as an adaptive technology by students with a variety of hand/arm impairments and some types of learning disabilities. Screen reading (synthesized speech) technologies, originally used by individuals with visual impairments, have crossed over into the mainstream and are increasingly available for wireless telephony-based e-mail enhancements. The same is true for mainstream scanners and optical character recognition software that are used as adaptive technologies by students with visual and other print impairments.

Some technologies have remained disability specific: Braille printers, captioning on video portions of web pages and CD-ROMs, magnification programs for students with visual impairments, head and foot mice, and the audio-cord [cf., Phonak's (2000) MicroLink FM system] which allows people with hearing impairments who use an FM system to hear voice output from a computer.

Thus, there appear to be three categories of computer technologies used by students with disabilities: mainstream computer hardware and software (e.g., mouse, word processing software), adaptive computer technologies (e.g., Braille printer), and those which are "adaptable" (e.g., scanner, dictation software). Students also use certain computer technologies in idiosyncratic highly creative ways, further clouding distinctions (e.g., a student with a communication impairment who uses an electronic agenda with "Indiglo" to communicate at social occasions, including poorly lit restaurants).

Although the lines between adaptive and mainstream computers are blurring in some areas, not all technologies can be considered accessible for all. As long as software and hardware are designed and built without consideration for their accessibility there will be "issues of accommodation" in areas of technology, as is the case in architecture. Thus, a general rule still applies: computer technologies must serve as tools to facilitate the execution of daily activities, and their use must be determined by the user's needs. This can only happen if users have access to the computer technologies they need.

Equity Issues

We are in danger of reproducing historical inequities through the failure to ensure the accessibility of the new computer and learning technologies that are rapidly becoming essential for all aspects of daily life in western societies in general, and in North America in particular. This, of course, includes educational institutions, including cegeps. Unless access is thought of at the beginning, our technological society will repeat the errors of the past by denying students with disabilities access to learning opportunities which involve technology literacy skills.

Students in both Studies 1 and 2 told us that some of the existing computer technologies, including the internet, cost too much for them to afford. Similarly, personnel who provide services to students with disabilities in cegeps indicated that they experienced serious problems with funding for computer related services for their institutions. They also indicated that they wished that students could have access to subsidized computer technologies more easily. Thus, the cost of equipment is a key factor in denying students equal access to the tools needed to succeed in cegep education. It follows that we need funding models which take equality into account, thereby allowing all people to participate in all aspects of society, including college education.

Canadian legal precedent indicates that equality does not necessarily mean "identical treatment" (see Huck vs. Odeon Theatres in Boyer, 1985). Thus, providing access for students with disabilities to the same software and hardware as their nondisabled peers does not constitute equal treatment if students are not able to make effective use of these technologies (e.g., if a student who is blind cannot use the interface because it has no voice or Braille capability). To provide "equal" treatment, the software must allow students with disabilities to use the same functions of the software as do nondisabled students. These ideas are exemplified in the seven principles of universal design for computer technologies proposed by Connell, Jones, Mace, Mueller, Mullick, Ostroff, Sanford, Steinfeld, Story, and Vanderheiden (1995). These authors also show how these principles can be applied to both hardware and software design to ensure accessibility not just for people with disabilities but also for the safety and comfort of all.

Universal Design - Barrier Free Access

Reviewing the common features among all samples studied in this investigation makes it evident that the potential of computer and adaptive computer technologies to remove barriers to students with disabilities is enormous. Nonetheless, environmental barriers are continually being created and it is important to consider the context in which students with disabilities learn [c.f. Gibson's (1993) views on ecological theory and distance education]. This makes it imperative that solutions be identified and implemented while the technologies and their implementation in cegeps are still in a developing stage.

There have been numerous calls to consider learners' preferred modalities for obtaining information in different learning contexts and instructional design (e.g., Barnett, 1992; Bradtmueller, 1979; Caudill, 1998; Cohen & McMullen, 2000; Papineau & Lohr, 1981; Reid, 1987; Wislock, 1993). Some students delight in visual-spatial learning, others prefer verbal representations, while others learn best by hearing information. As suggested by generative theories of multimedia learning (cf., Plass, Chun, Mayer, & Leutner, 1998), many prefer a combination, for example hearing and seeing text simultaneously (Montali & Lewandowski, 1996). This suggests that it is time to give all learners choices from which they can select conditions for learning which are optimal for them, thereby furthering their motivation to learn (Brophy, 1987). Thus, accommodating the needs of students with disabilities results in good teaching practices that are appropriate for all students

Including accessibility features in software and hardware is likely to benefit all users. For example, software designed for students with learning disabilities which highlights words as they are being read by a screen reader (synthesized speech) is likely to help second language students as well. Allowing students the choice to turn closed captioning on and off (text appearing at the bottom of the screen, such as subtitles on foreign films) is also likely to benefit nonnative speaker students as well as students who have difficulty making out specific words on video clips and those who wish to learn how to spell technical words or names. Allowing software to read what is on the screen, allowing alternative forms of input, such as dictation, and allowing people to choose auditory, written, or visual representations will to allow students to choose their own preferred learning modality, thereby permitting students with and without disabilities to gain control over their learning.

Planning for implementation: recommendations for educational and instructional technologists and planners. In response to the move toward the increasing use of technology in teaching and learning in the cegeps we offer the following suggestions to those involved in the process. If new computer technologies (e.g., web delivery of courses, math tutorials on CD-ROMs) are to become part of the norm in the cegeps, then there is a need to address access for learners with disabilities. The implication of not doing this is that educational technologies become exclusionary technologies.

- When conducting formative/summative evaluations of courseware, learners with disabilities should be included during field testing whenever possible. This ensures that problems with accessibility are identified and dealt with prior to implementation or adoption.
- New developments and beta versions should be advertised to students so that they know what's out there and can offer suggestions and feedback
- As a matter of course, subject matter experts in the area of accessibility need to be drawn into the instructional design process. The organizations and resources listed below are good places to start.
- Authorware tools with built-in accessibility features (e.g., WebCT, Blackboard) should be selected when designing web-based applications.
- There are free web-based tools, such as Cast's Bobby, that can evaluate web pages for their accessibility and provide suggestions for making appropriate improvements. In addition, NCAM's (2000) recently released free software MAGpie (Media Access Generator) provides the facility to add captions to QuickTime, SMIL, and SAMI formats, and to incorporate audio descriptions into SMIL presentations. A note of caution - at this time, these accessibility checkers and software from WGBH are available solely in English. There is a definite need to create French counterparts.

Why do designers fail to incorporate such seemingly obvious and inexpensive features? In some cases, their implementation is truly difficult. An example is interactive mathematics software, where changing a value in an equation for example, might result in a dynamic graph shown on the screen. To provide alternative means of accessing this information requires the assistance of a subject matter expert who can provide a verbal "analogue" of what is happening visually on the screen. In most cases, however, designers, planners and developers simply do not think of accessibility issues. They are inclined - due to tradition, not malice - to include the latest developments in technology-based delivery of courses. Nor are they well informed about what is likely to be helpful. Yet, as noted by IBM's David Best (2000, p.3), "digital technology and miniaturization are making it possible for accessibility to be an inherent part of any product design - if the designers think about it. Our challenge is to make them think about it." When alerted to problems, our experience has been that they often opt for, "Let's just finish developing the product, and then we'll add on the accessibility features later." Needless to say, by the time the product is finished, it is much too late to redesign the essentials to permit accessibility.

Such technology barriers are both disruptive and discouraging to some students with disabilities. If - or perhaps when - more disciplines and courses become available solely through technology-based teaching and learning, what will happen without the requisite accessibility? Truly, then, we will be entering the era of discriminating against students with disabilities by denying them access to certain fields of study. This cannot be allowed to happen!

The American experience, where powerful laws have worked to "sensitize" designers and developers (ADA, 1990; Department of Justice, 2000; Schauer, Barnicle, & Vanderheiden, 2000; Workforce Investment Act Of 1998: Sec. 508, 2000; Waddell, 2000), can provide an excellent guide for those interested in ensuring the accessibility of computer and learning technologies in colleges.

Access To Cegep For All

It is evident that students have a rich selection of computer adaptations to assist them if this is needed. In spite of such "technological marvels," however, many students have difficulty with access to computer-mediated educational materials.

Ensure Accessibility Of Courses For All Students

Cegep professors can do much to improve access to such course materials for these students. At colleges across Canada accessibility concerns are shifting to issues such as adapted computer work stations and internet that is accessible to all. A barrier-free learning community involves universal access to information, a commodity which is increasingly made available, both inside and outside the classroom, through computer technologies. The new computer technologies also promote alternative modes of teaching and learning, mainly by making it easier for students to participate more actively in their learning. Many see this active involvement by students as fostering superior problem-solving, transfer of knowledge to new situations, and motivation for further learning for all students (McKeachie, Pintrich, Lin, Smith, & Sharma, 1990).

As noted earlier, designing for accessibility in the first place is preferable to just in time adaptations that are likely to be expensive, cumbersome and often ineffective (cf., Ekberg, 1999; Jacobs, 1999). The move toward such "universal" and "barrier free" design is based on the assumption that environmental obstacles to people with disabilities also pose barriers to others (e.g., Falta, 1992, Brown & Vargo, 1993). Therefore, it is posited, good design for people with disabilities constitutes good design for people in general. This philosophy can be extended to the classroom setting. For example, reading what is projected onto the screen is helpful not only to students with visual and print impairments but also to students who have difficulty seeing the screen because they are sitting too far away. This is also likely to benefit students who learn more readily by hearing rather than seeing text-based information. In making computer-related adaptations, as well, the principle of universal design has much to commend it.

Professors, when thinking of students with disabilities, often think of students who use a wheelchair. When it comes to computer technologies, these students are by no means the only ones with access concerns. Even if two students have the same disability, their preferred solutions may be very different. The best thing for professors to do is to ask, and therefore learn from their students. The professor is knowledgeable about his or her discipline and subject material. It is the student, however, who is knowledgeable about what adaptations work best for him or her. So, the first step towards making your course accessible is, "Ask the student what would be helpful."

The trend of integrating newly emerging learning technologies (e.g., math software, on-line course delivery) across the postsecondary curriculum raises concerns about the accessibility of these technologies for learners with disabilities. For example, how do you accommodate a student who is blind in a calculus class that requires graphics rich math tutorial software or a deaf student who is faced with viewing video clips in an online course that is not closed captioned? More importantly, what are the implications of either excluding students with disabilities from these new learning opportunities or providing less attractive replacement activities? Although we do not have all the answers, clearly there are things that faculty can do that will assist these learners in this ever changing environment. These include: using tools (such as Cast's (1999) Bobby) to check the accessibility of web sites; placing plain text or html versions of documents on web pages in addition to Adobe Acrobat files; when designing online courses, choosing to use authorware (such as WebCT or Blackboard) which has some built-in accessibility features. Such efforts will go a long way toward making sure that the new technology-driven learning environment is one that is available to all.

Having said this, we also need to go beyond the notion that computers are simply enabling technologies for students with disabilities and that their use in the classroom should be curtailed. These are also transformative tools which can facilitate the use of pedagogical tools (learning strategies, teaching strategies). As transformative tools, computer technologies can help students develop their ability for structured yet flexible inquiry and investigation so that they can link ideas, explore solutions and examine consequences to create value from information (Donovan & Macklin, 1999). Computers in class also allow faculty to be actively involved in the learning-teaching loop by becoming designers, managers, mentors, and peers for this form of learning (Hoadley, Hsi, & Berman, 1995).

What follows is a detailed set of recommendations to three groups of individuals: cegep personnel responsible for providing services to students with disabilities; professors; and organizations, ministries, and policy making bodies which help students with disabilities obtain computer and adaptive computer technologies.

RECOMMENDATIONS FOR PROFESSORS

Based, in part, on the findings, the following recommendations are made with the assumption that faculty are interested in making their courses accessible to all of their students, but that they need specific reminders and suggestions - a check-list of sorts - to enable them to do so. The recommendations are by no means inclusive or highly technical. Instead, we have attempted to provide the minimal technical information that can allow professors to be "electronically welcoming" to their students with disabilities. As noted earlier, most of these accommodations are likely benefit all students, not only those with special needs.

To ensure that students with disabilities have "equal" access to course materials and the accompanying technology literacy skills we recommend that faculty dialogue with their students to find out what kinds of adaptations would be helpful, and base media selection on their needs. If part of the rationale for introducing "technology across the curriculum" is to prepare students to be technologically competent members of the labor force, then guaranteeing access to such technologies for students with disabilities is paramount.

Put Course Information On The Web Well Before The Beginning Of Term

Putting one's course outline on the web is helpful for all students. Many professors have already done this, not as accommodations for their students with disabilities, but to make things easier for themselves and their classes. This is especially helpful for students with disabilities. Many students with disabilities have to order their text books on audiotape. Since this is a time consuming process, knowing which books to order well before classes begin is likely to benefit those students who must access course materials using alternative media. Also, professors should note that some popular textbooks are now available on CD-ROM, as these may be useful for some students with print impairments as well as for students with limited use of their hands or arms (no need to hold books or to physically turn the pages).

Until putting course outlines on the web is standardized at the institution, it would be helpful if professors were to inform the person or office providing services to students with disabilities on campus when their course outline is available on the web. Similarly, putting assignments, handouts, lecture notes, and practice tests, etc. on the web in readily accessible formats (i.e., plain text or html) is likely to be useful for students who need to access print materials using alternative means. Needless to say, this is likely to benefit all of the professor's students.

Make Course Materials And Web Sites Universally Accessible

When designing web sites, the simpler the better. Pictures and images are problematic for some students with visual impairments. These are also problematic for nondisabled students with slow modems (images take a long time to download), for busy institutional servers (loading time is slow on many institutional systems during peak usage times), and for students in areas where internet connect time is very costly.

Students who are blind. Most of these students use software that reads electronic text that is on the screen (synthesized speech). Others use programs that transform electronic text into Braille. If there are no words, but simply images and dynamic graphics, there is nothing for screen readers (software that uses synthesized speech to read what is on the screen) to read or Braille displays to show (e.g., presentations written using Shockwave).

If possible, try to use HTML (web page) instead of Adobe Acrobat or PowerPoint presentations. At this time, elements of these file formats are problematic for some students who use screen-reading technologies.

Frames in web pages, too, pose problems for students who are blind, as do tables. Even text-based tables are problematic because screen reading technologies read from left to right. This does not allow information to be read in columns, leaving the student to reconstruct what column headings go with what data in the table. A "no tables" version is best for students who are blind, and bulleted lists are preferred to tables. If tables are an essential feature, be sure to include a header row (i.e., put a verbal title for each column so that the student can reconstruct what information in the body of the table goes with what column title).

In general, try to avoid Java. When you insert small pictures (e.g., GIFs and JPEGs), include "alt-tags" ("alternate text" - these are like the little yellow "screen tips" descriptions that you see when you leave your cursor on icons in Windows toolbars). When using figures or graphs, detailed descriptions should be included using either "alt-tags" or longdesc html attributes (this is a new picture description option for complex images and pictures in recent versions of web page editors - it allows one to describe what an image, picture or interactive element is supposed to do). Giving appropriate descriptions of such graphics is vital if these images are essential to the learning objectives.

Students who have low vision. Students with low vision also use screen reading technology. In addition, many use screen magnification. Modern mainstream programs allow for changes in font type, font size and background color, enabling students to enlarge letters and change the contrast. Most CD-ROMs and some popular software do not do this.

Projecting lecture notes from a web page or PowerPoint slides using a multimedia projector in class does not work well for many of these students unless the professor also reads what is on the screen and describes any images or interactive elements. Students who have a laptop in class may be able to follow the lecture under certain circumstances. Discussions with the institution's computer support technicians is likely to be helpful.

Students who have hearing impairments. As noted elsewhere, there are relatively few computer technologies available to assist students with hearing impairments. These students have difficulty with streaming audio, audio clips, music, and the audio portion of video clips. Closed captioning (subtitles which have to be turned "on" by the user), long available on some televisions shows, have only recently been introduced into the electronic world. Regrettably, this does not yet work very well.

A technological solution that works well for these students is e-mail and internet chat programs, including groupware which has "whiteboard" capability. Take note that while the student is looking at your slides, overheads, or projected web page, he or she cannot read your lips or look at the face and hands of an interpreter. Similarly, while working in a computer lab, the student may have difficulty looking at the screen while listening to your explanation about what to do. A discussion with the student about where to sit or stand and about other accommodations is likely to be helpful.

Students with learning disabilities. These students can profit from all kinds of computer and web access. Professors can help these students gain better access to their courses by ensuring that information is presented multi-modally (e.g., presenting the same information using both audio and text). In addition, adaptations that are useful for students with low vision and for students with hearing impairments can also be useful for students with learning disabilities (e.g., synthesized speech, use of specific foreground and background colors, dictation software, electronic note taker or lap top in class). Getting course outlines and assignments, providing uncomplicated web site navigation systems, and presenting small amounts of text per screen can all be helpful for students with some learning disabilities.

Other Useful Tips

Permit students to use "virtual office hours" using e-mail and allow students to: (1) use spelling and grammar checkers, (2) audiotape lectures, (3) take notes on a computer in class, and (4) submit assignments and exams in alternate formats such as e-mail, disk, fax, and audiotape.

As noted earlier, some students themselves often know a great deal about what kinds of technologies are helpful. Also, most cegeps employ someone who provides services to students with disabilities. This individual can advise professors about typical problems and solutions or the direct the professor to someone who is knowledgeable. There are a variety of resources available for making science and math courses accessible to students with print disabilities. These are outside the scope of this report. However, the individual on campus who is responsible for providing services to students with disabilities is likely to have additional information.

Make textbooks, course materials, assignments, handouts, etc., available in alternate formats. This allows all students to select the choice which best suits their individual learning style. Many students profit from electronic texts. Electronic text books, "course-packs," and electronic versions of all course materials are likely to be useful for all students. When making a disk version, most word processors, including those on Macintosh computers, can access ASCII text. When producing print materials for students with visual impairments, Arial 18 is the minimum font size for large print. Generous line spacing is also desirable for these students as well as for students with other print impairments. Note that simply making an enlargement with a photocopier is not as helpful as using a larger font. Handing out presentation materials on diskette at the beginning of the class may also allow some students who bring a computer to class to participate like everyone else.

RECOMMENDATIONS FOR INDIVIDUALS RESPONSIBLE FOR PROVIDING SERVICES TO CEGEP STUDENTS WITH DISABILITIES

Although technology integration in the cegeps is still in its early days, the evidence from a variety of sources, including cegep based Québec institutions, testify to what is coming (cf., Jacques Joly Consultant Inc., 1999; Office of Learning Technologies, 1998).

In reviewing institutional information technology services, Wasser (1998) refers to six important criteria for good technology access in postsecondary institutions. These are the same criteria that need to be considered when providing services to students with disabilities. It is important to impress upon all levels of administration that it is vital that these goals are met.

- Access to the institution's systems and the internet from a variety of locations at various times of the day
- Training on computers and the internet
- Technical support when and where students are using computers
- Digital libraries which provide on-line access to catalogues and electronic texts
- Faculty support and training on integrating technology into courses
- Responsiveness to the needs of the community (e.g., on-line application, e-mail, course and institutional information on the web)

Make Technology For Students With Disabilities Available On Your Campus

Some cegeps, especially smaller colleges and campuses, have little or no computer equipment or support for their students with disabilities. To date, this has not posed significant problems because enrolments are still low enough so that service providers can proceed with an individualised, case-by-case approach. But more students with disabilities are enrolling all the time. As the literature clearly indicates, computer technology is fast becoming a necessity that is levelling the playing field for students with disabilities. Campuses currently not offering computer supports for their students with disabilities need to carefully examine this situation in the future, when technology integration at the cegeps will be more complete. We hope that individuals responsible for providing services to cegep students with disabilities will make it a priority to become better informed about what software and hardware are currently available, what, if anything is being purchased, and what some of the related issues are. Service providers from French cegeps need to encourage vendors and suppliers to make software and manuals available in French.

Provide Off-Hours Access To Computer Technologies

Most students have academic work schedules that differ from those of the traditional "nine to five" working day (e.g., writing and doing research during the evenings and weekends). Some students also have transportation and health concerns (e.g., fluctuating levels of energy during the day, restrictive schedules of adaptive transportation). These make it critical that students with disabilities be given as much, if not more, access at school to computer technologies as their nondisabled counterparts receive. As noted in the findings, this is especially important for cegeps in Québec's outlying regions.

At many cegeps, mainstream computer labs and libraries have extended evening and weekend hours to meet the needs of their students. In recognition of this reality, and keeping in mind that some students with disabilities have no up-to-date equipment of their own to use off campus, individuals responsible for providing services to cegep students with disabilities need to develop creative solutions to allow students to use equipment where it is currently housed (e.g., have students turn in their ID cards at security, have them "sign in," install a key card system). An alternative is to move computer equipment out of restrictive "nine to five" locations into less limiting ones, such as mainstream computer labs or libraries. In cases where this is not possible the institution may wish to develop a program to loan equipment to students. For example, students could benefit from being able to use laptops to work on assignments between classes, to take their own notes in class, give presentations, work in groups or communicate with other students. Such technological solutions could not only benefit students but could also be cost-effective. One suggestion made by participants was to develop a computer technology loan bank for students which is located at the two central cegeps' parcs mobiles des appareils.

Let Students With Disabilities Know What Is Available To Them On Campus

If equipment is to be used, students with disabilities need to be made aware of its existence. At the start of every semester, new and old students alike should be acquainted with the types of technological supports available to them, where these can be found, and when they can be used. It is important to remember that some students with disabilities have little contact with service providers. Therefore, "open house" or other campus wide publicity, in adapted formats, may be useful. Print announcements in college bulletins reach only a subset of students with disabilities.

There is sometimes an assumption that only certain students with disabilities will benefit from specific pieces of hardware or software. However as both the literature (e.g., Elkind, 1998; HEATH, 1999) and our own data show, students with disabilities do, in fact, "cross-use" technology. For example, students who are blind and those with specific learning disabilities both reported using screen readers. Rather than assume or prescribe computer supports for students, students must be allowed to try all kinds of available computer supports to decide for themselves what might work best for them. Indeed, allowing students to become familiar with the types of equipment available and to try out new types of technologies may result in creative solutions to students' computing problems.

Educate Professors About The Importance Of Ensuring Accessibility In Their Courses

Without a doubt, the face of postsecondary education is changing as computers and the internet are being integrated into the curriculum (e.g., Mercier, 1999; Office of Learning Technologies, 1998).

Although many technology integrations have shown that students dislike this component or that learning is not different in courses which do and which and those which do not involve computer technologies (see Russell, 1997,1999), recent Canadian studies of internet-based classes suggest that these are at least no worse than traditional classes but better than traditional correspondence courses (e.g., MacDonald & Wideman's study cited in Evaluation by York U., 1999). While it is by no means clear that computer based learning is superior to traditional delivery of education, what is clear is that in the foreseeable future, it is not only here to stay but will proliferate. Many faculty are scrambling learn the basic skills need to function given the new realities (cf., UCLA Graduate School of Education & Information Studies, 1999). Given a general lack of sophistication, it should come as no surprise that professors generally don't know what kinds of things to do to ensure that students have full access to their electronic course materials [e.g., that Adobe Acrobat PDF files can have problems with accessibility for students with print impairments, that PowerPoint is problematic for some students with visual impairments, that text (.txt) versions that work in Windows don't necessarily work in a DOS environment, that students with hearing impairments will probably miss audio clips on web pages and CD-ROMs, that some students have problems in computer labs when using a mouse, etc. (cf., Banks & Coombs, 1998). They simply do not think of these issues when they are developing their courses. To help with this problem, we suggest that personnel providing services to students with disabilities consider holding a workshop or open house for professors concerning making electronic course materials accessible and useful for all of their students - inviting sophisticated computer user students with different disabilities is likely to help drive the important points home. Inserting a module on issues related to students with disabilities into regular computer courses geared toward faculty is also likely to be helpful.

Make Training A Priority Both For Students And College Personnel

"Does CMC (computer mediated communication) present individuals with disabilities opportunities or barriers?" This is the provocative title of Gold's (1997) recent article in CMC Magazine. This comment is echoed in a recent US College Board report (Gladieux, & Swail, 1999). To ensure that students with disabilities who need information about computer, information and adaptive technologies are provided with this quickly and accurately, it is imperative that individuals responsible for providing services to cegep students with disabilities be aware that these technologies exist and that they know how to operate them. In turn, they can transmit that knowledge to the students. As well, this technological know-how can be transmitted to professors. In the knowledge-based society of the 21st century it is imperative that the emerging educational system be environmentally friendly to all individuals (Butlin, 1999). Of course, this includes students with disabilities.

Lack of knowledge about how to use specialized computer technologies on the part of both students and staff who oversee the technology is an important concern. If it is to be used effectively, systematic training must be seen as part of the overall investment in the equipment itself.

Many students are intimidated by computer technologies. Others are not given the appropriate support to use it to its optimum. Rectifying this situation starts with having knowledgeable staff at the school who know how to use the equipment. Where offices responsible for providing services to students with disabilities have adaptive technology "specialists" or technicians responsible for overseeing the equipment, time and opportunities must be provided to allow them to learn to use the technologies. Periodic "in-service" workshops, demos by students or colleagues from other cegeps or neighbouring universities, professionals, or representatives of adaptive technology organizations and companies can provide a change of pace as well as information. Whether it is providing educational opportunities or allotting time to allow staff to learn on their own, this activity must take place.

Where adaptive technologies are located at various points and campuses, other staff (e.g., library staff, staff in computer labs) need to receive at least minimal training to enable them to assist students. Then, and only then, can students with disabilities themselves be adequately trained.

Many institutions offer students one day or half day workshops and hand-outs on the use of campus computer facilities. The same must hold true for students with disabilities. This doesn't have to be an expensive undertaking. Some students on campus have probably developed expertise in the use of specific hardware or software. Using a mentoring approach, these sophisticated students can be paired with other students who could benefit from their help. It makes sense that if there is equipment on campus, it is the responsibility of the institution to ensure that appropriate training takes place so that students can use the equipment. Putting a bunch of PCs in classrooms without offering students and faculty instruction in how to operate the equipment makes little sense for colleges. The same goes for computer equipment for students with disabilities.

Include Students With Disabilities In All Computer, Learning, And Adaptive Computer Technology Acquisition Decisions

To ensure that the computer technologies purchased will actually be used by students, it is vital that students with disabilities be included in the decision making process. This is particularly important since our findings indicate that needs and concerns of personnel responsible for providing services to students with disabilities are often different from those of the students. Because of the nature of their tasks, issues that are important to service providers frequently relate to institutional concerns, budgets, relations with other sections of the cegep, etc. Both student and service provider perspectives are valuable, and students can be involved in the decision making process whether the institution has a formal or an informal decision making structure for the acquisition of new technologies. What may seem "interesting" or "useful" may be "too complex" or "useless" to the students themselves. In many instances students have prior experience using computer equipment that personnel responsible for providing services to students with disabilities do not have. It is important to take advantage of this most important resource - the students themselves. In smaller cegeps, where students may not have the required expertise, the equipment loan banks at the two central cegeps can offer good advice.

Value The Opinions Of Students With Disabilities

If equipment sits idle, there is obviously a reason. Rather than assume "lack of interest" or "lack of knowledge" on the part of students, proactive steps should be taken to evaluate the views and opinions of students on the state of equipment and support available to them on campus. Candid, non-defensive discussions can be beneficial. Anonymous yearly "formative" evaluations can also be useful in providing honest feedback. If students are dissatisfied with the equipment and support currently available to them, what better argument to take to senior administration to lobby them for better or more funding for specialized computer technology and related support?

Make Acquisition Decisions That Reflect The Needs Of All Students With Disabilities

Computer and adaptive computer technologies at the cegeps should meet the needs of all students with disabilities. In this regard, it needs to be stressed that some adaptive technologies can be "cross-used" by students with different disabilities (cf. HEATH, 1999). Thus, "educated" acquisition decisions can, in the long run, prove to be more cost effective. For example, screen readers, as we found, can be beneficial not only to students who are blind or have low vision but also to students with specific learning disabilities. Similarly, voice recognition software can be useful to a host of students with disabilities.

Become Informed And Share Information On Government Programs Offering Technology-Based Assistance For Students With Disabilities

It is evident from our findings that the vast majority of students in the cegeps are not aware of what programs exist to help them acquire computer technologies. Personnel responsible for providing services to cegep students with disabilities also were poorly informed. Many did not see this aspect of computer support for students with disabilities as part of their mandate.

Individuals responsible for providing services to cegep students with disabilities need to seek out information about funding sources and make this available not only to the students they serve, but also to individuals who work in other sectors of the cegep which come into contact with students with disabilities: for example, financial aid offices, learning centers, counselling, and health services. Additionally, personnel responsible for providing services to students with disabilities should offer assistance and guidance to students in navigating through the maze of application requirements that often accompany such programs. After all, the more equipment students have for personal use, the lower the demand on institutional resources!

Make Internet Access For Students With Disabilities A Priority

Our research indicates that cegeps provide internet access to their students. However, only some cegeps have adapted computers (e.g., computers with screen readers) that are capable of going online. The wealth of information available to students, the fact that course material and other school related information are increasingly being put on the web, and the usefulness of e-mail are three strong reasons why providing adapted internet access is critical. We recommend that service providers advocate strongly to this effect to the computing professionals on campus.

Take Advantage Of The Experience Of Others

Talking to your colleagues in the field, consulting other resources, and involving knowledgeable organizations as well as individuals with expertise on campus will make providing computer and adaptive computer resources in the future less daunting than expected. Lessons learned at cegeps that are of similar size as yours, knowledge about specific government programs to tap for funds, and strategies for dealing with administration doesn't have to be done in isolation.

In the future, with more computer mediated learning activities and a greater role for mainstream computer labs will necessitate the active involvement of other sectors in the cegep (e.g., consultation with intersectorial committees including students, academic computer departments, computing support services, audio-visual, the library, learning center, physical plant representatives, faculty, student affairs, and adaptive technologists). This has been recommended by others as well (e.g., Burgstahler, 1992, 1993).

Get Involved In Planning Bodies Responsible For Institution-Wide Information Technology Purchases And Systems Development

Two trends are evident in postsecondary institutions. Colleges are adopting policies to ensure that their campuses are networked for the new millennium. They are also experimenting with new methods of delivering education (e.g., adding computer lab components to courses, placing course materials on the web; interactive tutorials, communities of learners, WebCT, distance education). These trends have consequences that affect the types of accommodations students with disabilities will require in the near future.

Involvement with other areas of the school can have benefits both for the present as well as for the future. Personnel responsible for providing services to cegep students with disabilities must actively make themselves aware of the institutional "agenda" concerning campus-wide information technology purchases and systems development. They must lobby, strongly, on behalf of and in partnership with students with disabilities to ensure that accessibility of new computer and information technologies is made a priority. This is also true for computer based distance education courses, which are increasingly using computer and information technologies (Cuneo, 2000; Vallée, 1995). Such courses are already offered in the francophone cegeps (e.g., Centre collégial de formation à distance at Collège de Rosemont) and universities (e.g., TéléUniversité). Indeed, it is expected that by 2002, 15% of US postsecondary students will be enrolled in online courses - a three fold increase over current levels (International Data Corp cited in Schofield, 1999). To ensure inclusion of all students in classroom activities, adaptive computer equipment will have to be available in mainstream computer labs and site licenses and server versions of adaptive software will need to be acquired in many instances.

Guidelines, in English, for making programs and activities accessible have been proposed by several postsecondary educational institutions. Good examples are materials from Oregon State University (WWW accessibility guidelines, hardware accessibility guidelines, software access guidelines 1999b, c, d, respectively) and Santa Monica College (1999). The distance education guidelines from the Chancellor's Office of California Community Colleges (High Tech Center Training Unit, 1999) is also an excellent resource.

Possible suggestions are: push strongly to ensure that all campus internet servers and web pages meet the minimum requirements for universal accessibility [eg: the W3C site (Chisholm et al., 1999); Cast's (Cooper, 1999) Bobby Accessibility Checker]; make sure that a text-based browser is available; ensure that knowledgeable students and representatives of the office for students with disabilities sit on committees that review and implement campus-wide computing decisions to ensure that accessibility is always on the agenda; work with professors and academic computing staff to educate them on access issues related to internet and computer components of their courses (see recommendations for faculty for more details); influence decision makers to ensure that electronic versions of textbooks, "course-packs," and other instructional materials are made available in conjunction with print versions of the same information. These issues must be planned for and dealt with from the beginning, and not on an "ad hoc" basis, when it may be too late to do something for the student. The key point here is to work alongside, rather than separately from the campus community as a whole in addressing computer accessibility.

Individuals providing services to cegep students with disabilities must lobby the government, rehabilitation centres, the technology loan banks, etc., to provide easier application processes, to relax strict rules barring students with certain disabilities, and any other "red-tape" that may stand in the way of students receiving technologies they require.

RECOMMENDATIONS FOR GOVERNMENT ORGANIZATIONS, MINISTRIES, REHABILITATION AGENCIES AND OTHERS INVOLVED IN FORMULATING POLICIES REGARDING ACCESS TO COMPUTER TECHNOLOGIES

The single most outstanding finding of our studies relates to students' concerns over the cost of computer and adaptive computer technologies. The high cost of acquiring and maintaining computer technologies was the single most important and common issue noted by computer users and non-users alike. The majority of students who had computer equipment at home indicated that they or their families had paid for these. When asked why they did not take advantage of a government program to help them obtain a computer or adaptive technologies, the single most popular answer was that students simply did not know about the existence of such programs.

The solution to the problem is obvious: government programs, organizations and agencies that provide money, loans or computer technologies to students with disabilities need to do more effective "outreach." More broadly based information dissemination to better inform students (in alternate formats), financial aid offices, cegep personnel responsible for providing services to students with disabilities, and rehabilitation professionals about available opportunities is clearly needed. Involving and informing interested individuals from high schools can also be useful so that the students can meet application deadlines that occur before they entering cegep.

Make The Cegep Community More Aware About The Programs Available To Them And About Changes To These Programs As They Occur /

Clarify And Make Transparent The Rules And Criteria For Eligibility /

Simplify The Application Process And Make Application Information And Forms Available In Alternate Formats

Our research clearly shows that both cegep students with disabilities as well as cegep personnel responsible for services to students with disabilities are poorly informed about government programs which help students acquire computer and adaptive computer technologies. Specific rules and eligibility criteria for programs are also not well known even by individuals who are aware of the existence of specific programs.

To rectify the situation, we recommend that all government programs, organizations and agencies make the effort to inform the cegep community about the full range of programs, the rules and regulations, and the eligibility criteria. Provide all information that could be helpful to potential applicants and to the college personnel who advise students with disabilities concerning financial matters.

Information packages should also be sent both to the Québec and to the Canada-wide associations of students with disabilities (i.e., AQEIPS and NEADS) as well as to cegep personnel responsible for services to students with disabilities for broad based dissemination to students and other concerned professionals (e.g., financial aid officers). Material should be made available, of course, in alternate formats (i.e., Braille, tape, diskette, regular and large print). Information should also be posted on accessible web sites, and the location widely publicised. In Quebec, the postsecondary student association AQEIPS is one of the best ways to reach students with disabilities as they can inform their membership and help distribute such materials.

On-site visits by program officials to meet with students and with personnel responsible for services to cegep students with disabilities would also be useful. An orientation to government assistance programs which relate to computer technologies at conferences for the postsecondary education community (e.g., CADSPPE / ACCSEHP) would also be helpful. In this regard, a good beginning was recently made in the anglophone sector. The Montreal Association for the Blind convened an intersectorial committee comprised of representatives of the rehabilitation agency and of individuals responsible for providing services to cegep and university students with disabilities. This is now a standing committee which has already met at the locales of both the rehabilitation agency as well as at both a cegep and a university. This has allowed informal information sharing both at the face-to-face and electronic levels, as the grouping has set up a listserv (electronic discussion forum) to facilitate dialogue.

In addition, informing the general community can also be useful. If more potential students know about available programs, perhaps more would enroll.

Provide Flexibility In All Programs To Allow For Upgrading And/Or Updating Students' Equipment

As noted by the professor participants, the useful life of a computer is between 3 and 5 years. Students with disabilities often spend long periods in cegeps because they are taking a reduced course load. Thus, it often takes students with disabilities considerably longer to graduate than their nondisabled peers (Horn & Berktold, 1999; Leblanc, 1999; Wolfe, & Stokley, 1998). Because of rapid changes in the computer industry and incompatibilities between newer and older technologies many students in Study 1 indicated that they had to acquire a second computer, since their first one had become obsolete. Yet, certain programs fail to provide students with subsidies or updated equipment. In the case of students with disabilities this short sighted approach to subsidy programs clearly needs to be modified.

Treat Different Impairments On Equal Terms

Students with certain types of impairments are denied access to government programs. Similarly cegep personnel working with students who have disabilities are often limited in their ability to provide computer, information and adaptive technologies to students with specific impairments due to lack of funding for students with specific disabilities. In fact, data from Study 3 show that cegeps are funded for providing services to only 1/3 of the students whom they actually serve. This puts an undue burden on the cegep, the service providers, and rehabilitation centers, as well as the students concerned and limits students with "unrecognised" impairments in the pursuit of higher education.

To encourage equity in education, government programs need to recognize all impairments on equal terms. There is substantial variability both in the availability of government funding and subsidy programs and in the application process. This can be confusing for students as well as for cegep disability service providers. This state of affairs has resulted in disparities concerning who qualifies for financial assistance for computer technologies. Discrepancies based on the nature, degree, and source of the impairment exist within Québec (Barile, 1990; Fougeyrollas, Lippel, St-Onge, Gervais, Boucher, Bernard, & Lavoie, 1999). To rectify these, it is important to cover the costs that are specifically related to disability, thereby ensuring the delivery of disability-related supports that are appropriate to individual requirements (Rioux-Marchand, 1994).

Lemieux-Brassard (1996) pointed out that, frequently, there are discrepancies between the intent of laws and policies which deal with persons with disabilities and their implementation. This can also be said of policies and regulations concerning education that were created and modified between 1979 and 1999. Findings of this investigation showed that many cegep students were unable to benefit from subsidy programs either because their impairments or disabilities were excluded from the eligibility criteria or because their impairment or disability was not deemed to be sufficiently severe. In a study funded by the Conseil Québécois de la recherche sociale (CQRS), Fougeyrollas et al. (1999) noted that policies in Quebec also reflect an overall inconsistency in subsidy programs.

In addition, the criteria concerning what constitutes a disability are unclear. It can be seen in our results that depending on whose definition is used, the number of postsecondary students with disabilities in Québec varies by more than 100%. This is important, because definitional issues determine whether students are eligible for subsidy programs for computer, information and adaptive technologies and whether the cegep receives funding for providing services, including computer supports, for these students. First, it is difficult to tell how many students with disabilities actually attend postsecondary education in Québec. So it isn't the definition of the disability alone, that is problematic, but also the criteria for who qualifies for what programs.

Our data indicate that 5-1/2% of the student body of Canadian colleges are registered with offices for students with disabilities. The numbers are substantially lower in Québec, where even the most optimistic way of evaluating the percentage of students with disabilities in the cegeps puts the figure at 1/2%. As explored in Study 3, we have no viable explanation for the discrepancy. Others, too, have lamented the small number of students with disabilities in the cegeps (Allie & Hébert, 1998; OPHQ, 1995). Clearly, more active recruitment of students with disabilities is needed. Also, more research is needed to understand the reasons for the huge discrepancy and to explore how this can best be eliminated.

Do Not Take Parental Income Into Account When Adult Students With Disabilities Live With Their Parents

The average age of cegep students with disabilities was 23 - considerably older than that of cegep students in general. It is often the case that adult students with disabilities live with their parents to facilitate aspects of daily living. To take the situation to an extreme, it is certainly inappropriate to take the income of a 30 year old student's parents into account when determining his or her eligibility for a bursary. Remember that identical treatment is not equal treatment (cf., Huck vs. Odeon Theatres in Boyer, 1985).

Shorten Waiting Periods And Fund Training

Courses at cegeps have firm start and end times. Exams and assignments are scheduled with fixed dates. Students who need to use computer and adaptive computer technologies must be able to access these in a timely manner. Our data suggest that waiting periods in many government programs are simply too long to meet the needs of cegep students with disabilities. Shorten waiting periods and ensure that equipment and training are consistent with the needs of students in the cegeps. It would also be important to provide training sessions across the province for service providers.

RESOURCES

North American campuses are becoming increasingly "wired" and the technology is pervading all aspects of academic life [cf., America's 100 most wired colleges - 1999 (2000), EDUCAUSE Online Guide to Evaluating Information Technology on Campus (2000)]. This is also true in Québec, which has been at the forefront of computer and internet use in the francophone world (Labrèche, 2000; PricewaterhouseCoopers, 2000; Statistics Canada, 1999). It is clear that the integration of computer-mediated and web-based learning into curricula are top priorities at schools across North America, including Québec's cegeps. As noted recently at the Congrès de l'Association canadienne de l'éducation à distance (ACED), the knowledge based economy and development in online education has not bypassed Québec (Cartier, 2000).

Consistent with this trend, computer technologies are rapidly becoming a part of the everyday lives of the cegep community: professionally, personally and academically. Because computer knowledge is a necessity for effective participation in the new Québec economy, computer literacy and know-how are part of most postsecondary students' formal education. One need only look at pioneering work in Québec cegeps and universities to see this trend in action (e.g., APOP, 2000; Dedic, Rosenfield, Cooper, & Fuchs, 2000).

The Need For Computer-Related Accessibility Resources In French

When we went to the literature to find the best resources to include in the recommendations to professors, we were dismayed at the paucity of information available on how to make computer technologies accessible to individuals with various disabilities. Those on our team who are anglophone have access to a vast collection of information in English - virtually all of it from our American neighbours to the south. The luxury of having easy access to materials produced "next door" is not available to the francophone cegep community because Québec is the most technologically advanced of all francophone communities (Labrèche, 2000; PricewaterhouseCoopers, 2000; Statistics Canada, 1999).

So materials in French will simply have to be produced in Québec. This will give Québec a preeminent role in facilitating the integration of individuals with disabilities in many countries, including Belgium and France. A variety of cegep organizations are well positioned to do this in collaboration with representatives from other sectors, including cegep students with disabilities, service providers, developers and suppliers of adaptive computer technologies, both academic and service orientated computer technologists, "high tech" rehabilitation professionals in a variety of areas, as well as representatives of government organizations and agencies. Organizations well positioned to carry out this task include:

- APOP - l'Association des applications pédagogiques de l'ordinateur au postsecondaire <http://www.apop.qc.ca/>
- CCFD - Centre collégial de formation à distance < http://ccfd.crosemont.qc.ca/>
- CDC - Centre de documentation collégiale < http://www.cdc.qc.ca/ >
- CCDMD - Centre collégial de développement de matériel didactique < http://www.ccdmd.qc.ca/ >
- La Vitrine APO - Applications pédagogiques de l'ordinateur <http://www.vitrine.collegebdeb.qc.ca/vitrine/>

Create a task force on accessibility of the new electronic media. Creative partnerships between these organizations and other segments of the disability, rehabilitation, cegep, and university communities are urgently needed. This grouping could conduct an evaluation of the community's needs and propose a plan of action for improving access. Among tasks that will need to be carried out are the following.

Create a French-language clearinghouse of information on the internet. It is clear that much of the software and know-how currently exists mainly in English. The Québec government, through the OPHQ acting in collaboration with the central cegep loan banks, needs to move toward investing the funds and resources necessary to provide information on adaptive computer technologies, guidelines for accessible web sites, etc., in French. Providing such information on a central web site would go a long way toward increasing the accessibility of the new computer technologies across the province.

Form an electronic discussion group (listserv) on adaptive computer technologies. Such a listserv could be devoted to the needs and concerns of francophone college students with disabilities and individuals responsible for providing services to them. To form a large pool of individuals with expertise, we recommend joining forces with Québec's universities in this endeavour.

Conduct annual evaluations of services being provided. Equipment loan banks and government subsidy and equipment grant programs need to implement an evaluation process through which they can get feedback from the students, from the individuals providing services to students with disabilities, and from other concerned individuals and grouping from the cegep community (e.g., administrators, computer support personnel). Not only will this help decision makers gain an appreciation of the "realities," but it will give programs an opportunity to better reflect the needs of the students they serve. Of course it goes without saying that such evaluations are only useful if recommendations are implemented.

Free And Inexpensive Technologies: Including Students In Computer-Based Activities When No Specialized Adaptive Computer Technologies Are Available

There are a variety of mainstream, free or inexpensive computer technologies that can be used. These have proven to be very helpful, especially when expensive and powerful adaptive technologies are unavailable. Many are fully bilingual and work in both French and English. Most, although not all, are Windows based. We have written about these technologies in both English and French (Fichten, Lavers, Barile, Asuncion, Généreux, & Robillard, 1999) and have posted the most recent version on our web site (<http://omega.dawsoncollege.qc.ca/adaptech.htm>). These are not meant to replace the sophisticated, dedicated adaptive programs designed for individuals with specific disabilities or impairments. What makes these free or inexpensive technologies interesting is that they provide "quick and dirty" solutions to frequent problems such as having to make a last minute handout for a student who needs an audiotape or assisting a student who is dealing with a lengthy waiting period or delay for subsidized equipment. Similarly, when a student who is blind needs to read material available on a disk on an unadapted computer, free or inexpensive document reading software can be accessed. Unless the material is scientific or highly technical, these free or inexpensive technologies can read the material to the student without the assistance of a reader. Similarly, free and inexpensive magnification software can allow students with low vision to see what is on the computer screen. Closed captioning features of some free mainstream media players can make information more accessible to students with hearing impairments.

We are in no way suggesting that these are adequate replacements for the more powerful adaptive software packages available on the market. However, they are useful tools that can be helpful on a short-term basis. It is important to note that these free or inexpensive alternatives lack both the power and features that most students would require for heavy use.

Basic Resources

A barrier-free learning community involves universal access to information (c.f. Ekberg, 1999); guidelines for making programs and activities accessible have been proposed by several postsecondary educational institutions. Good examples are materials from Oregon State University (1999a, 1999b, 1999c), Santa Monica College (1999), and the Chancellor's Office of California Community Colleges (High Tech Center Training Unit, 1999). The following organizations and web sites, mostly American, are also likely to have interesting, easily implementable solutions to common problems experienced by students with disabilities.

Basic Resources: English

- Adaptech Project <http://omega.dawsoncollege.qc.ca/adaptech.htm>
- Adobe (1999). Acrobat 4.0 and PDF accessibility. <http://access.adobe.com/access_state.html>
- Apple & Special Needs. <http://www.apple.com/education/k12/disability/message.html>
- AQEIPS (Association québécoise des étudiants ayant des incapacités au postsecondaire): H.E.C., Université de Montréal
- ATRC (Adaptive Technology Resource Centre). <http://www.utoronto.ca/atrc/>
- Bobby Accessibility Checker. <http://www.cast.org/bobby>
- High Tech Center Training Unit (1999, August). Distance education: Access guidelines for students with disabilities. <http://www.htctu.fhda.edu/dlguidelines/final%20dl%20guidelines.htm>
- Chisholm, W., Vanderheiden, G., & Jacobs, I. (1999). Web content accessibility guidelines 1.0 - W3C recommendation 5-May-1999. <http://www.w3.org/TR/WAI-WEBCONTENT/wai-pageauth.html>
- EASI <http://www.rit.edu/~easi/index.htm>
- IBM (2000). IBM special needs systems guidelines <http://www-3.ibm.com/able/guidelines.htm>
- Microsoft Corporation (1999). Accessibility & Microsoft: Microsoft accessibility technology for everyone. <http://www.microsoft.com/enable/microsoft/default.htm>
- NCAM (National Center for Accessible Media). (2000). Media access generator (MAGpie). Available April 8, 2000 on the World Wide Web. <http://www.wgbh.org/wgbh/pages/ncam/webaccess/magindex.html>
- NEADS (National Educational Association of Disabled Students). http://www.neads.ca/
- Trace Research and Development Center. http://www.trace.wisc.edu/

Basic Resources: French

- Association Canadienne des Conseillers en Services aux Étudiants Handicapés au Postsecondaire (ACCSEHP) http://www.cadsppe.cacuss.ca/
- Association nationale des étudiants handicapés au niveau post-secondaire. http://www.neads.ca/
- AQEIPS (Association québécoise des étudiants ayant des incapacités au postsecondaire): H.E.C., Université de Montréal.
- Association de l'industrie des appareils et accessoires fonctionnels du Canada (CanADIA). http://www.starlingweb.com/adp/index.htm

- Centre d'Information et de Solutions pour Personnes Handicapées (IBM-France). http://www.fr.ibm.com/france/enfrance/social/cisph.htm#debut
- Icom' Centre de ressources informatiques. http://www.handicap-icom.asso.fr/accueil.htm
- Info-route sur la déficience vers l'intégration et l'éducation. http://laurence.canlearn.ca/Francais/apprend/newguidedaccessibilite/indie/in
- La surdité au Québec. http:// www.surdite.org/
- Office des personnes handicapées du Québec. http://www.ophq.gouv.qc.ca/
- Projet Adaptech. http://omega.dawsoncollege.qc.ca/adaptech.htm
- Répertoire canadien des organismes de personnes handicapées. http://www.cegep-st-jerome.qc.ca/tes/PERHAND.htm
- Site internet pour l'éducation spécialisée (Michel Landry : CVM). http://pages.infinit.net/eduspe/index.htm
- Visuaide. http://www.visuaide.com
- Vitrine APO (Applications Pédagogiques de l'Ordinateur). http://vitrine.ntic.org/vitrine

CONCLUSIONS

Computer technologies can act as facilitators or obstacles for students with disabilities. Little effort is required to make materials accessible to all students. Moreover, nondisabled students are likely to benefit from the recommended modifications as well.

Our approach to the conceptualization of computer, learning and adaptive computer technologies is that it is environmental factors and accessibility features of computer and information technologies that form either facilitators or obstacles to students with disabilities. For example, environmental factors can either be obstacles (e.g., printed material for people who have print disabilities), or facilitators (e.g., printed material for people with hearing impairments). Of course, the same environmental factors can either be "facilitators" or "obstacles" (e.g., speech on CD-ROMs are facilitators for students with visual impairments but barriers for students with hearing impairments). Social, political, and environmental aspects of funding programs for students with disabilities can create both access as well as exclusion.

The argument that, "granting equality to the disabled population group is not justifiable because of the cost, because of opposing values, or because of the inconvenience to mainstream society" (Nagler, 1993, p. 33) is often made in this context. We contend that this type of argumentation needs to be rebutted wherever it surfaces. A small investment today is likely to pay handsome dividends in the long run. Not only are universal design concepts cheaper than retrofits (e.g., Falta, 1992; Mary Frances Laughton cited in Harvey, 1999; Node Networking, 1998), but computer and learning technology accommodations made today for students with disabilities will benefit many sectors of society in the long run, including the aging baby-boomers, many of whom are computer literate and will soon find themselves in need of adaptations due to disabilities and impairments that emerge with aging. Many may remember that ramps and curb cuts intended for people in wheelchairs have also benefited people with baby carriages, those moving equipment, rollerbladers, etc. (cf., Coombs, 1998.).

Environmental factors have been implicated in denying people with disabilities goods and services as well as education. Participants in our research seemed aware that many present educational policies dealing with students with disabilities act as "obstacles" rather than "facilitators" in determining access to education for students with disabilities by denying them access to what is rapidly becoming a necessity for cegep students. Many offered creative solutions to turn these into facilitators, as they were intended.

These should not be ignored. Computer and adaptive computer technologies are no longer a luxury to assist a few privileged individuals. Current trends in postsecondary education make it virtually impossible for students to complete their education if they have no access to computers or to the internet. The main problems with policies arise from the fact that, as noted by Lemieux-Brassard (1996), there are discrepancies between the intent of the policies and how they are applied.

Many policies reflect the view that problems originate from within the individual rather than arising from the environment. The approach taken, therefore, is to try to remediate or to provide accommodation for individual impairments (e.g., Whiteneck and Fougeyrollas' 1996 PPH model). If, however, one locates the problem in the environment and prevailing social structure, as suggested by the social model of disability (Oliver, 1990; Oliver, 1996; Swain, Finkelstein, French, & Oliver, 1993), then the environment is the problem and it is the environment that must be "remediated." Unless there is a shift away from the current person-centered ideology toward a broader, more systemic view then students with disabilities will continue to be denied full access to postsecondary education because computer and information technologies will continue to be designed and built with inaccessible features or they will be inaccessible, financially, to the schools and to the students themselves

The enormous potential of computers to remove obstacles to students with disabilities and concerns over obstacles posed by limitations in access were central issues noted by participants in all categories in all studies of the research. Implicit is the message that various groups need to work together to ensure better access. This includes: industries that design and build software and hardware; educational technologists and instructional designers, policy makers who create laws regarding information technologies; policy makers who plan programs which provide access to computer technologies for students with disabilities; educational and government administrators; "front line workers" who provide information to students with disabilities; professors; and, most important, consumers with disabilities.

Elsewhere we made concrete recommendations for specific groups whose collaboration is vitally needed in the cegep milieu. These people and organizations all have a role in ensuring that computer technologies are accessible and affordable. If the access issues noted by our participants are not addressed and if changes in existing policies and procedures are not made, we will approach the next decade with a knowledge-based society wherein people with disabilities will again be segregated by virtue of an inaccessible environment.

Computers are best seen as enabling technologies - "electronic curb-cuts" - that allow students with disabilities to prepare for and to participate in the knowledge based economy of tomorrow. To ensure that cegep students with disabilities have "equal" access to course materials we encourage those who design, manufacture, and develop instructional materials, systems, and infrastructure to dialogue with people who are knowledgeable about the needs and concerns of students with disabilities to find out what kinds of adaptations would be helpful. This includes, first and foremost, students with different types of disabilities, as those living with the impairments best understand their needs (cf., Johnson, 1993). In this regard, it may be wise to follow Microsoft's example of hiring qualified individuals with disabilities (cf., Williams, 2000). Other concerned groups include personnel responsible for providing disability related services in cegeps, manufacturers and developers of adaptive computer technologies, high tech occupational therapists and adaptive technology trainers. Working collaboratively to design accessible computer and information technologies for educational use will result in better instructional tools for all learners.

Computers can create access to information and education, thereby allowing cegep students with disabilities freedom, independence, and access to the tools of the knowledge-based economy. The new computer technologies are changing the role of many sectors in society, including those of professors and individuals responsible for providing services to students with disabilities in the cegeps. Meeting the challenges posed by these changes is a task for all individuals involved in ensuring... access to cegep for all.

BIBLIOGRAPHY

1997 National Survey of Information Technology in Higher Education. (1997, October). **More technology in the syllabus, more campuses impose IT requirements and student fees**. The Campus Computing Project. Retrieved on January 25, 1999 from the World Wide Web: http://www.campuscomputing.net/summaries/1998/index.html.

1998 National Survey of Information Technology in Higher Education. (1998). **Colleges struggle with IT planning - The Campus Computing Project**. Retrieved on November 4, 1998 from the World Wide Web: http://www.campuscomputing.net/summaries/1998/index.html.

Abrami, P. & Bures, M. E. (in press). Computer-supported collaborative learning and distance education. **American Journal of Distance Education**.

Abrami, P. C., Chambers, B., Poulsen, C., Kouros, C., Farrell, M. & d'Apollonia, S. (1995). Positive social interdependence and classroom climate. **Genetic, Social, and General Psychology Monographs**, **120**, 327-346.

Abrami, P.C., Chambers, B., Poulsen, C., De Simone, C., d'Apollonia, S. & Howden, J. (1995). **Classroom connections: Understanding and using cooperative learning**. Toronto, Ontario: Harcourt Brace.

ADA. (1990). **Americans with Disabilities Act of 1990: Public Law 101-336**. Washington, D.C.: Government of the United States.

Adaptech Project. (undated). **Adaptech project web site**. Retrieved on August 22, 1999 from the World Wide Web: http://omega.dawsoncollege.qc.ca/adaptech.htm.

Adobe. (1999). **Acrobat 4.0 and PDF accessibility**. Retrieved on August 26, 1999 from the World Wide Web: http://access.adobe.com/access_state.html.

AHEAD (Association on Higher Education and Disability). (undated). **AHEAD web site**. Retrieved on August 20, 1999 from the World Wide Web: http://www.ahead.org/.

Airone, E. (1998, July 15). **COTR population**. Received on July 15, 1998 by fax from: (250) 489 8218.

Albrektson, J. R. (1995, October). Monitored online seminar: A model for graduate-level distance learning. **T.H.E. Journal**, 102-105.

Alliance for Technology Access. (1994). **Computer resources for people with disabilities: A guide to exploring today's assistive technology** (2nd ed.). Salt Lake City, UT: Hunter House Publishers.

Allie, R. & Hébert, A. (1998). **État de situation de la thématique des services éducatifs et de la formation continue (Chapitre 7).** Drummondville, QC: Office des personnes handicapées du Québec. Abstract available on the World Wide Web: http://www.ophq.gouv.qc.ca/Thematiques/Bilan98/Bilan_Educatifs.htm#integration

AlphaSmart. (2000). **AlphaSmart's Webpage**. Retrieved on April 8, 2000 from the World Wide Web: http://www.alphasmart.com/.

Amsel, R., & Fichten, C.S. (1988). Effects of contact on thoughts about interaction with students who have a physical disability. **Journal of Rehabilitation, 54**(1), 61-65.

Amsel, R., & Fichten, C.S. (1990a). Interaction between disabled and nondisabled college students and their professors: A comparison. **Journal of Postsecondary Education and Disability**, **8**(1), 125-140. Abstracted in **Higher Education Abstracts**, **26**(1), 45.

Amsel, R., & Fichten, C.S. (1990b). Interaction between college students and their professors: A comparison of students' and professors' views. **College Student Journal, 24**(2), 196-208.

Anderson, A. A. (1996). Predictors of computer anxiety and performance in information systems. **Computers in Human Behavior**, **1**(2), 61-77.

Anderson, M. A. (1995, Feb.). Cooperative group tasks and their relationship to peer acceptance and cooperation. **Journal of Learning Disabilities**, **18**(2), 82-86.

Angus Reid Group. (2000a). **Face of the web study pegs global internet population at more than 300 million.** Available June 13, 2000 on the World Wide Web: http://www.angusreid.com/MEDIA/CONTENT/displaypr.cfm?id_to_view=1001

Angus Reid Group. (2000b). **Face of the web: Wave one - charts**. Available June 13, 2000 on the World Wide Web: http://www.angusreid.com/MEDIA/CONTENT/pdf/mr000322_ch.pdf

APOP (Association des applications pédagogiques de l'ordinateur au postsecondaire). (2000, June). **Annual conference of the Association pour les applications pédagogiques de l'ordinateur au postsecondaire**. Cegep Marie-Victorin, Montréal, Québec. Available June 15, 2000 on the World Wide Web: <http://www.apop.qc.ca:808/colloqueAPOP/recherche.html>

Apple Computer Inc. (2000). **Apple & Special Needs**. Retrieved on March 26, 2000 on the World Wide Web: http://www.apple.com/education/k12/disability/message.html.

Association Canadienne des Conseillers en Services aux Étudiants Handicapés au Postsecondaire (ACCSEHP) (2000). Website: http://www.cadsppe.cacuss.ca/

Association de l'industrie des appareils et accessoires fonctionnels du Canada (CanADIA) (2000). Website : http://www.starlingweb.com/adp/index.htm

Association of Canadian Community Colleges (ACCC). (2000). **Listing of members**. Retrieved February, 2000 from the World Wide Web: http://www.accc.ca/.

Association of Universities and Colleges of Canada (AUCC). (2000). **Listing of members and total enrolment**. Retrieved February, 2000 from the World Wide Web: http://www.aucc.ca/.

Association Québécoise des Étudiants Handicapés au Postsecondaire (AQEHPS). (1999, January). **Les étudiants ayant des incapacités, un regard statistique**. Montreal, Quebec: Author.

Asuncion, J., Fichten, C.S., Barile, M. (2000, May). **Distance education for all: Inclusion of learners with disabilities.** Presentation at the annual Conference of the Canadian Association for Distance Education (CADE), Québec, Québec. Abstracted in the Conference Program. Available April 19, 2000 on the World Wide Web: http://www.ulaval.ca/aced2000cade/francais/resumes.htm

ATRC (Adaptive Technology Resource Centre). (1999). **ATRC web site**. Retrieved August 1999 from the World Wide Web: http://www.utoronto.ca/atrc/

Aurora Systems Inc. (1996a, Dec.). **The communication station on the web**. Available web site: http://www.djtech.com/Aurora.

Aurora Systems Inc. (1996b, Dec.). **The great talking box**. Available web site: http://www.djtech.com/Aurora.

Banks, R. & Coombs, N. (1998). The spider and the fly. **CMC (Computer-Mediated Communication Magazine)**, **5**(2), Retrieved on August 25, 1999 from the World Wide Web: http://www.december.com/cmc/mag/1998/feb/toc.html

Barile, M. (1990). Disabled women: An exploited genderless underclass. **Compass: Special Edition on Disabled Women and Poverty**, 10-12.

Barile, M. (1993). **Women with disabilities define system-based discrimination**. Unpublished manuscript.

Barile, M. (1996). Education and employment in the next millennium. **Women's Education des Femmes**, **12**(2), 42-44.

Barile, M. Fichten, C.S. Robillard, C., Fossey, M., Généreux, C., Guimont, J.P. (2000, May). Informatique et technologies adaptées dans les cégeps pour les étudiant(e)s ayant des limitations fonctionnelles (ITAC) : Résultats préliminaires / Computer And Adaptive Computer Technologies For Students With Disabilities In The Cegeps: Preliminary Results. Presentation at the 12th Colloque de l'ARC, Hull, Québec. Abstracted in **Propositions De Communication** (p.11). Available April 26, 2000 on the World Wide Web: http://www.coll-outao.qc.ca/sdrp/ARC/ARC_PROP.htm

Barnes, C. (1996). Institutional discrimination against disabled people and the campaign for anti-discrimination legislation. In D. Taylor (Ed.), **Critical Social Policy: A reader** (pp. 95-112). London, UK: Sage Publications.

Barnett, G.A. (1992). The acoustical presentation of technical information. **Journal of Technical Writing and Communication**, **22**(1), 39-52.

Baron, R. A. Byrne, D. (undated). **Social psychology: Understanding human interaction** (7th ed.). Boston, MA: Allyn & Bacon.

Bausch, P.T. (1994). The impact of the Americans with Disabilities Act on university continuing education. **Journal of Continuing Education**, **42**(3), 10-15.

Becker, B. J. (1996). A look at the literature (and other resources) on teaching statistics. **Journal of Educational & Behavioral Statistics**, **21**(1), 71-90.

Behnaz, B., Brassard, L-B., Locheed, C, Shellenburg, G. & Smith F. (1993). Study of financial assistance available to post-secondary students with disabilities: Accommodating individuals needs for the future. Ottawa:: National Educational Association of Disabled Students (NEADS).

Behnia, B., Lemieux-Brassard, L., Lockheed, C., Schellenberg, G., & Smith, F. (1993). **Study of financial assistance available to post-secondary students with disabilities: Accommodating individual needs for the future**. Ottawa, ON: National Educational Association of Disabled Students.

Bergman, E. & Johnson, E. (1995). **Towards accessible human-computer interaction**. Retrieved on April 7, 2000 from the World Wide Web: http://www.sun.com/tech/access/updt.HCI.advance.html

Bergman, M. (1996). Computer ethics: Fostering self-sufficiency in people with cognitive challenges. **Disability Today**, **6**(1), 54-56.

Best, D. (2000, Spring). Editorial: Closing the technology gap. **CNIB Vision**, **3**.

Bickenbach, J. (1993). **Physical disability and social policy**. Toronto: University of Toronto Press.

Bina, M. J. (1986). Social skills development through cooperative group learning strategies. **Education of the Visually Handicapped**, **18**(1), 27-38.

Bissonnette, L. (1995). **Tutorial in distance education: Study of telecommunications, the disabled and futures and implications for education**. Unpublished manuscript, Concordia University Montreal, Quebec.

Bondy, J. (1999, January). **College registration request**. Received via e-mail <bondy@ocas.on.ca>

Boschen, K. A. & Krane, N. (1992). A history of independent living in Canada. **Canadian Journal of Rehabilitation**, **6**(2), 79-88.

Bourassa, G. (1999, February 9). **New Brunswick Community College - Students registered in regular programs for a duration of 20 weeks or more for academic year 1998-1999**. Received February 9, 1999 by fax from: (506) 789 2430.

Bourassa, G. (1999, March, 1). **New Brunswick Community College - 10 year statistical summary of students with disabilities served by the New Brunswick Community College - Saint John**. Available Web Site: http://www.saint.john.nbcc.nb.ca.

Boyer, P. (1985). Huck vs. Odeon Theatres. In **Equality for all: Report of the parliamentary committee on equality rights**. Ottawa: House of Commons.

Bradtmueller, W.G. (1979). Auditory perception as an aid to learning in the content areas. **Journal of the Association for the Study of Perception**, **14**(1), 27-29.

Brophy, J. (1987). Synthesis of research on strategies for motivating students to learn. **Educational Leadership**, **45**, 40-48.

Brown, A.L. (1994). The advancement of learning. **Educational Researcher**, **21**, 4-12.

Brown C. (1989). **Computer access in higher education for students with disabilities: A practical guide to the selection and use of adapted computer technology** (2nd ed.). Sacramento: California Community College, High-Tech Centre for the Disabled. United States Department of Education.

Brown, D.S. & Vargo, J. (1993). Bibliography of resources on universal design. **Journal of Rehabilitation**, **59**(3), 8-11.

Brown, S., Roth H. & Duncan, B. (1995). Searching electronic networks for information on disability. **International Rehabilitation Review**, **46**(1 & 2), 25-27.

Browning, P., White, A.T., Nave, G. W., & Barkin, P. (1985). Interactive video as an instructional technology for handicapped learners: A development and research program. **Journal of Developmental Disabilities**, **11**(3), 123-128.

Burgstahler, S. (1992). **Computing services for physically disabled students in post-secondary institutions: Results of a survey in Washington state.** Unpublished manuscript. University of Washington, Washington, DC, USA.

Burgstahler, S. (1993). Computing services for disabled students in institutions of higher education. **Dissertation abstracts international, The Human and Social Sciences**, **54** (1), 102-A.

Burgstahler, S. (1998). Making web pages universally accessible. **CMC Magazine**. Retrieved August 23, 1999 on the World Wide Web: http://www.december.com/cmc/mag/1998/jan/burg.html

Burgstahler, S. (2000). **Providing services for post-secondary students: Funding issues**. University of Washington: Information System, Computing & Communications. Retrieved on April 7, 2000, from the World Wide Web: http://www.csun.edu/cod/conf2000/proceedings/0120Burgstahler.html.

Burris, G.L. (1998, January). **Assistive technology support and strategies – A summary**. Unpublished Manuscript. Southwest Missouri State University, Springfield, Missouri, 65804.

Busch, T. (1995). Gender differences in self-efficacy and attitudes toward computers. **Journal of Educational Computing Research**, **12**(2), 147-58.

Butlin, G. (1999). Determinants of postsecondary participation. **Education Quarterly Review**, **5**(3), 9-35. Statistics Canada Cat. No. 81-003.

CACUSS (Canadian Association of College and University Student Services). (1999). **CACUSS web site.** Retrieved August 20, 1999 on the World Wide Web: <http://www2.cacuss.ca/cacuss/>.

CADSPPE/ACCSEHP. (1999). **Towards developing professional standards of service: A report on support for students with disabilities in postsecondary education in Canada**. Retrieved October 9, 1999 on the World Wide Web: http://www.cadsppe.cacuss.ca/english/CADSPPE-Standards/CADSPPE-Standards.html

Campbell, B. (1999, March). **Diffusion of computer technologies into university teaching: Professional practices**. Presentation at Concordia University, Ed. Tech Department, Montréal, Québec.

Campbell, L.M. & Waddell, C.D. (1997). **Electronic curbcuts: How to build an accessible Web site**. Retrieved April 18 1999 from the World Wide Web: http://www.jsrd.or.jp/dinf_us/ilf/ecc.htm.

Campus Backbone Connectivity. (1999). **Syllabus**, April, p.10.

Cantor, A. (1998, September). **Accommodating people with disabilities in web-based training programs.** Unpublished manuscript. Available on the World Wide Web: http://www.interlog.com/~acantor/ .

Carter, M. (in press). An evaluation of the requirements for a new English language grammatical tool and teaching environment. **Proceedings of the 2nd International Conference on Dyslexia in Higher Education: Learning along the continuum**. Loughborough University.

Cartier, M. (2000). **Québec 2005 : quel contexte pour l'enseignement à distance?** Presentation at the annual Conference of the Canadian Association for Distance Education (CADE), Québec, Québec. Abstracted in the Conference Program. Available April 19, 2000 on the World Wide Web: <http://www.ulaval.ca/aced2000cade/francais/resumes.htm>

Cast. (1999). **Bobby accessibility checker**. Retrieved September, 1999 from the Worl Wide Web: http://www.cast.org/bobby.

Caudill, G. (1998). Matching teaching and learning styles. **Technology Connection**, **4**(8), 11, 24-25.

Centre d'Information et de Solutions pour Personnes Handicapées (IBM-France) (2000). Website: http://www.fr.ibm.com/france/enfrance/social/cisph.htm#debut

Chisholm, W., Vanderheiden, G., & Jacobs, I. (1999a). **List of checkpoints for Web content accessibility guidelines 1.0 - W3C**. Retrieved March 26, 2000 from the World Wide Web: http://www.w3.org/TR/WAI-WEBCONTENT/full-checklist.html

Chisholm, W., Vanderheiden, G., & Jacobs, I. (1999b). **List of checkpoints for Web content accessibility guidelines 1.0 - W3C**. Retrieved May 6, 1999 from the World Wide Web: http://www.w3.org/TR/1999/WAI-WEBCONTENT-19990505/checkpoint-list.html.

Chisholm, W., Vanderheiden, G., & Jacobs, I. (1999c). **Web content accessibility guidelines 1.0 - W3C recommendation 5-May-1999**. Retrieved May 5, 1999 from the World Wide Web: http://www.w3.org/TR/1999/WAI-WEBCONTENT-19990505/wai-pageauth.html.

CIC (1996). **Committee on Institutional Cooperation**. Available on the World Wide Web: http://www.cic.net/cic

CIRP Press Release (1999, January). **Most of the nation's college freshmen embrace the internet as an educational tool, UCLA study finds**. Retrieved March 13, 1999 from the World Wide Web: http://www.gseis.ucla.edu/heri/press98.html.

Clark, J. (1999). **Internet utilization by persons with disabilities**. Presentation at the annual conference of CSUN (California State University, Northridge): Technology and persons with disabilities - Where assistive technology meets the information age. Los Angeles. Available from Jenny Clark <jenny.clark@emich.edu>

CNS (Computerized Notetaking System). (2000). **C-Note System**. Received May 11, 2000 e-mail: miroslav@sunet.net, address: Miroslav Posavec, IBS Global Inc., 564 29th Ave SW., Vero Beach, FL, 32968 USA, telephone: 561 569 8350, fax: 561 569 8351.

Cohen, S. & McMullen, B. (2000). Shifts in thinking: A primer of the foundations of instructional technology assessment. **Syllabus, 13**(6), 12-14.

Colley, A.M., Gale, M.T., & Harris, T.A. (1994). Effects of gender role identity and experience on computer attitude components. **Journal of Educational Computing Research, 10**(2), 129-137.

Colombo, J.R. (1994). **The 1995 Canadian global almanac**. Toronto, Ontario: Macmillan Canada.

Connell, B. R., Jones, M., Mace, R., Mueller, J., Mullick, A., Ostroff, E., Sanford, J., Steinfeld, E., Story, M., & Vanderheiden, G. (1995). **The principles of universal design** (Version 1.1 - 12/7/95). Retrieved Available April 7, 2000 from the World Wide Web: <http://www.trace.wisc.edu/text/univdesn/ud_princ/ud_princ.html>

Cook, A. M., & Hussey, S. M. (1995). **Assistive technologies: Principles and practice**. Toronto: Mosby.

Coomber, S. (1996). **Inclusion: Strategies for accommodating students with disabilities who use adaptive technology in the classroom.** Vancouver: Human Resources Development Canada, Disabled Persons Participation Program.

Coombs, N. (1989, August). The computer as the great communicator. **T.H.E. Journal**, 57-58.

Coombs, N. (1998, Feb.). **The underprivileged and universal access to distance learning: Disabilities and beyond**. Presentation at the 1998 EvNet Conference, Montréal, Québec. Retrieved May 20, 1999 on the World Wide Web: : http://socserv2.mcmaster.ca/srnet/confabstracts/coombsab.htm

Coombs, N., & Banks, R. (2000). **Distance learning and students with disabilities: Easy tips for teachers**. Retrieved on April 9, 2000 from the World Wide Web: http://www.csun.edu/cod/conf2000/proceeding/0119Coombs.html.

Cooper, M. (1999). **Universal design of a Web site –** CSUN '99 presentation. Retrieved May 6, 1999 from the World Wide Web: http://www.cast.org/presentations/mcooper/csun1999/.

Cooperman, K. (1999, January). **Most of the nation's college freshmen embrace the internet as an educational tool, UCLA study finds**. Retrieved August 25, 1999 on the World Wide Web: http://www.uclanews.ucla.edu/docs/KC010.html

Cuneo, C. (1996). **EVNET network for the evaluation of education and training technologies.** Unpublished manuscript, McMaster University, Hamilton, ON.

Cuneo, C. (1997, February). **If technology is the answer what are the questions?** Presentation to the Group to Renew and Enhance Effective Teaching (GREET), Ryerson Polytechnic University, Toronto. Available e-mail: <cuneo@macmaster.ca>

Cuneo, C. (2000). **The underbelly of online learning in Canadian post-secondary education: Campus Computing International (Canada). Report prepared for Industry Canada**. Available Dr. C. Cuneo, McMaster University, Hamilton, ON, Canada, L8S 4M4.

Cunningham, C., & Combs, N. (1997). **Information access and adaptive technology**. Phoenix: Oryx Press.

Czaja, S.J. & Sharit, J.(1998). Age differences in attitudes toward computers. **Journal of Gerontology, 53B**(5), 329-340.

Day, H. & Jutai, J. (1996). Measuring the psychosocial impact of assistive devices: The PIADS. **Canadian Journal of Rehabilitation, 9**(3), 159-168.

Dedic, H., Rosenfield, S., Cooper, M. & Fuchs, M. (2000). **"Do I really hafta?" WebCal - A look at the use of livemath software in web-based materials that provide interactive engagement in a collaborative learning environment for differential calculus.** EvNet Working Papers Series. Available June 15, 2000 on the World Wide Web: <http://evnet-nt1.mcmaster.ca/network/workingpapers/Ere_Rosen/WebCal.htm>

Della Mattia, G. (1999). **The Advanced Education Council of B.C. - B.C. Enrollments.** Retrieved January 29, 1999 from the World Wide Web: http://www.biv.com/search/results.asp?fhres=/current/480/8%2D2.html&search=list

Department of Justice (2000). **Section 508 Home Page**. Retrieved April 9, 2000 on the World Wide Web: <http://www.usdoj.gov/crt/508/508home.html>.

Développement des ressources humaines Canada (1999). **Orientations futures du gouvernement du Canada concernant les personnes handicapées - La pleine citoyenneté : une responsabilité collective / Future directions to address disability issues for the government of Canada: Working together for full citizenship**. Ottawa: Gouvernement du Canada. French: No de cat.: MP80-2/11-1999F. Retrieved June 15, 2000 on the World Wide Web: French: http://www.hrdc-drhc.gc.ca/socpol/reports/disability/contf.shtml, English http://www.hrdc-drhc.gc.ca/socpol/reports/disability/conte.shtml

Dirr, P.J. (1999). Distance and virtual learning in the United States. In Glen Farrell (Ed.), **The development of virtual education: A global perspective** (pp. 23 - 48). Vancouver, B.C.: The Commonwealth of Learning. Retrieved September 20, 1999 on the World Wide Web: http://www.col.org/virtualed/

Disabled students in postsecondary education. (1997). **Digest of Education Statistics**, Table 211.

Do-It (1997). **World wide access: Accessible web design**. Available on the World Wide Web: http://weber.u.washington.edu/~doit/

Donovan, M. C., & Macklin, S. (1999). New learning technologies: One size doesn't fit all. **Planning for Higher Education**, **28**, 10-18.

Drake, M. & Stahl, J. M. (1995). Design and use of a U.S. census data computer laboratory for teaching undergraduate research methods. **Behavior Research Methods, Instruments, & Computers, 27**(2) 285-288.

Dufour, C. (Mai 1992). **Bilan du suivi des recommandations de la politique a part egale (document de réflexion OPHQ).** Quebec: Office des Personnes Handicapees du Quebec.

EASI. (1998). **EASI's computer evaluation kit for colleges.** Retrieved June 11, 1998 from World Wide Web: http://www.rit.edu/~easi/pubs/adakit.html.

EASI. (1999). **EASI web site.** Retrieved August, 1999 from the World Wide Web: http://www.rit.edu/~easi/index.html

Echenberg, H. (1997). **Disability policy: Paradigms and instruments**. Unpublished manuscript.

EDUCAUSE (2000). **Online Guide to Evaluating Information Technology on Campus**. Retrieved March 25, 2000 on the World Wide Web: http://www.educause.edu/consumerguide/

Ekberg, J. (1999). **A step forward: Design for all**. Helsinki, Finland: Include. Available from the author at STAKES, PO Box 220, SF-00531, Helsinki, Finland. Available e-mail: jan.ekberg@stakes.fi

Elkind, J. (1998). Computer reading for machines for poor readers. **Perspectives: The International Dyslexia Association, 24**(2).

Epp, M.A. (1996). **A study of the use of Braille and electronic texts in B.C. colleges and institutes - Braille survey**. Unpublished manuscript, Langara College, British Columbia.

Epp, M.A. (1998). **B.C. college and institute library services (CILS) user survey, preliminary report**. Unpublished manuscript, Langara College, British Columbia.

Estey, S., & Alphonse, L. (2000). **National directory of financial assistance programs for post-secondary students with disabilities**. Ontario, Carleton University: National Educational Association of Disabled Students. Available on the World Wide Web: http://www.neads.ca.

Falta, P.L. (1992, November). **Vers l'accessibilité universelle.** Presented at the Colloque scientifique international "10 ans de recherche à partager." Montreal, QC.

Farrell, G. (1999). The development of virtual institutions in Canada (pp.13-22). In Glen Farrell (Ed.) **The development of virtual education: A global perspective.** Vancouver, B.C.: The Commonwealth of Learning.

Fawcett, G. (1996). **Living with disability in Canada: An economic portrait**. Hull, Quebec: Human Resources Development Canada, Office for Disability Issues.

Federal/Provincial/Territorial Ministers Responsible for Social Services. (1998). **In unison: A Canadian approach to disability issues- A vision paper.** Available World Wide Web: http://socialunion.gc.ca.

Fédération des cégeps. (1998). **Listing of public colleges**. Available on World Wide Web: http://www.meq.gouv.qc.ca/ens-sup/ens-coll/etablis.htm#cegeps

Fichten, C.S. (1985a). Interaction between college students who have a physical disability and their professors and peers. **Prospectives, 21**, 130-133.

Fichten, C.S. (1985b). The experience of doing research at the cegep level. **Prospectives, 21**, 169-174. Excerpted in **Association for Research in the Colleges (ARC) Bulletin,** No.**2**, January, 1988, 4-6, and in **Factuel**, 1990, **2**(2), 13.

Fichten, C.S. (1986). Self, other and situation-referent automatic thoughts: Interaction between people who have a physical disability and those who do not. **Cognitive Therapy and Research, 10,** 571-587.

Fichten, C.S. (1987). College Interaction Self-Statement Test (CISST). [Microfiche]. **ETS Test Collection.** Princeton, N.J.: Educational Testing Service (Tests in Microfiche, Set P, No. 0167365).

Fichten, C.S. (1988). Students with physical disabilities in higher education: Attitudes and beliefs that affect integration. In H.E. Yuker (Ed.), **Attitudes toward persons with disabilities** (pp.171-186). New York: Springer.

Fichten, C.S. (1994, Nov.). Breaking down the invisible barriers: Challenges for the 21st century / Eliminer les barrières invisibles: le défi du XXI^{e} siècle. Keynote address at the annual convention of the National Educational Association of Disabled Students (NEADS) / Partners in Education / Partenaires en éducation, November, Montréal. Abstracted in **NEADS: Partners in Education Conference Program / Partenaires en Éducation Programme Officiel.** Ottawa: NEADS, Carleton University.

Fichten, C.S. (1995a). Paradigmes, partenariats, et la prochaine génération d'acteurs dynamiques de changement: les étudiants handicapés des collèges. **Revue Canadienne de Réadaptation, 9**(1), 3-16.

Fichten, C.S. (1995b). Success in postsecondary education: Hidden barriers and how to overcome them. **Rehabilitation Digest, 25**(4), 16-21.

Fichten, C.S. (1995c). Let's compile a list of resources! **The Able Informer - Resource Newsletter for People with Disabilities** [On-line], **1**(7), 6-7. Available: 71033.1073@compuserve.com

Fichten, C.S. (1995d). A first step: Basic resources on sexuality for people with and without disabilities. **The Able Informer** [On-line], **1**(9), 3-4. Available: 71033.1073@compuserve.com

Fichten, C.S. (1995e). Oh, to sleep... Investigating insomnia and the aging process. In E. Bander, M. Boulle, J. Moore, A. Pringle, P. Simpson & C. Southmayd (Eds.). **In celebration: Words and images from Dawson College** (pp. 115-116). Montréal: Dawson College.

Fichten, C.S. (2000). **Combined data set for the ITAC and DSSFocus responses**. Unpublished document. Montréal: Dawson College.

Fichten, C.S., & Amsel, R. (1986). Trait attributions about physically disabled college students: Circumplex analyses and methodological issues. **Journal of Applied Social Psychology, 16,** 410-427.

Fichten, C.S., & Amsel, R. (1988). Thoughts concerning interaction between college students who have a physical disability and their nondisabled peers. **Rehabilitation Counseling Bulletin, 32**(1), 22-40.

Fichten, C.S., Amsel, R., Bourdon, C.V., & Creti, L. (1988). Interaction between college students with a physical disability and their professors. **Journal of Applied Rehabilitation Counseling, 19**(1), 13-20.

Fichten, C.S., Amsel, R., Robillard, K., & Tagalakis, V. (1991). Thoughts about interaction between nondisabled and disabled individuals: Situational constraints, states-of-mind, valenced thoughts. **Cognitive Therapy and Research, 15**(5), 345-369.

Fichten, C.S. Barile, M. & Asuncion, J.V. (1999a, Spring). **Learning technologies: Students with disabilities in postsecondary education.** Dawson College: Project Adaptech: L'Utilisation des technologies d'apprentissage par les étudiant(e)s handicapé(e)s au niveau postsecondaire (190 pages). ISBN 2-9803316-4-3. Final report to the Office of Learning Technologies. Ottawa: Human Resources Development Canada. Abstracted and available September 7, 1999 on the World Wide Web in English: http://olt-bta.hrdc-drhc.gc.ca/publicat/Dawson79160exe.html and in French at http://olt-bta.hrdc-drhc.gc.ca/francais/publicat/Dawson79160exf.html Full text version Retrieved in English September 7, 1999 on the World Wide Web: http://olt-bta.hrdc-drhc.gc.ca/download/Dawson79160.pdf

Fichten, C.S. Barile, M. & Asuncion, J.V. (1999b, Spring). **Appendix to: Learning technologies: Students with disabilities in postsecondary education - Final report to the Office of Learning Technologies.** (107 pages). ISBN 2-9803316-5-1. Ottawa: Human Resources Development Canada: http://www.omega.dawsoncollege.qc.ca/adaptech/olt99app.pdf

Fichten, C.S., Barile, M., Robillard, C., Fossey, M., Généreux, C., & Guimont, J.P. (2000, June). Projet Adaptech: Collège Dawson - Informatique et technologies adaptées dans les cégeps. In A. Cantin (Chair), **Les TIC : qu'est-ce que ça change pour les sciences humaines ?** Panel presentation at the annual conference of the Association pour les applications pédagogiques de l'ordinateur au postsecondaire (APOP), Montréal, Québec.

Fichten, C.S., Bourdon, C.V., Creti, L., & Martos, J.G. (1987a). Facilitation of teaching and learning: What professors, students with a physical disability and institutions of higher education can do. **Natcon, 14,** 45-69.

Fichten, C.S., Bourdon, C.V., Creti, L., & Martos, J.G. (1987b). Ce que les professeurs, les étudiants ayant un handicap physique et les établissements d'enseignement supérieurs peuvent faire pour faciliter l'enseignement et l'apprentissage. **Connat, 14,** 49-77.

Fichten, S., Généreux, C., Asuncion, J., Lavers, J., Guimont, J.P., Barile, M., & Alapin, I. (1998, June). **L'utilisation de technologies d'apprentissage informatiques et adaptées, gratuites et non spécialisées pour enseigner aux étudiants handicapés.** Presentation at the annual conference of the Association pour les applications pédagogiques de l'ordinateur au postsecondaire (APOP), Ste-Foy, Québec.

Fichten, C.S., Goodrick, G., & Tagalakis, V. (1988). **Disabled student - professor interaction: Behavior coding manual for student behaviors.** Technical manual, Dawson College: Montreal.

Fichten, C.S., Goodrick, G., Tagalakis, V., Amsel, R., & Libman, E. (1990). Getting along in college: Recommendations for students with disabilities and their professors. **Rehabilitation Counselling Bulletin**, **34** (2), 103-125.

Fichten, C.S., Lavers, J., Barile, M., Asuncion, J., Généreux, C. & Robillard, C. (1999a). Mainstream and "free" computer information and adaptive technologies revisited. **Alert: The Official Newsletter of the Association on Higher Education and Disability (AHEAD)**, **23**(2), 12-14.

Fichten, C.S., Lavers, J., Barile, M., Asuncion, J., Généreux, C., & Robillard, C. (1999b, May). Les technologies informatiques et d'apprentissage conventionnelles et adaptées. Home page of **La Vitrine APO (Applications Pédagogiques de l'Ordinateur)** Available May 12, 1999 on the World Wide Web: <http://vitrine.ntic.org/vitrine/veille/textes/adaptes.html>.

Fichten, C.S., & Martos, J.G. (1986). Cognition coding manual: Interaction between able-bodied and physically disabled people. **Resources in Education**, **21**(5), 50-51. (ERIC Document Reproduction Service, ED No. 264679)

Fichten, C.S., Robillard, K., Judd, D., & Amsel, R. (1989). College students with a physical disability: Myths and realities. **Rehabilitation Psychology**, **34**(4), 243-257.

Fichten, C.S., Robillard, K., Tagalakis, V., & Amsel, R. (1991). Casual interaction between college students with various disabilities and their nondisabled peers: The internal dialogue. **Rehabilitation Psychology**, **36**(1), 3-20.

Fichten, C.S., Spector, I., Amsel, R., Creti, L., Brender, W. & Libman, E., (in press). Sexual Self-Efficacy Scale - Form E: Erectile functioning. In C.M. Davis, W.H. Yarber, R. Bauserman, G. Schreer, & S.L. Davis (Eds.). **Sexuality-related measures: A compendium** (2nd ed.). N.Y.: Sage Publications.

Fine M., & Asch, A. (1981, July). Disabled women: Sexism without the pedestal. **Journal of Sociology and Social Welfare, 8**(8), 233-245.

Fine, M. & Asch, A. (1988a). Introduction: Beyond the pedestals. In M. Fine & A. Asch (Eds.), **Women with disabilities: Essays in psychology, culture, and politics**. Philadelphia: Temple University Press.

Fine, M., & Asch, A. (1988b). Disability beyond stigma: Social interaction discrimination, and activism. **Journal of Social Issues, 44**(1), 3-21.

Fougeyrollas, P. (1990). Les implications de la diffusion de la classification international des handicaps sur les politiques concernant les personnes handicapées. **Rapport Trimestriel de Statistiques Sanitaire Mondiales, 43**(4), 281-285.

Fougeyrollas, P. (1996a). Driving an automobile: An example using environmental analysis of the handicap situations creation process and how to prevent them. **ICIDH and Environmental Factors International Network, 8**(3), 42-48.

Fougeyrollas P. (1996b). Environmental determinants in methodology of measuring disease and trauma consequences. **ICIDH Environmental Factors International Network, 8**(3), 14-18.

Fougeyrollas, P., Cloutier, R., Bergeron, H., Cote, J., & St Michel, G. (1996). **The Quebec classification: Disability creation process**. Quebec: International Network on the Disability Creation Process.

Fougeyrollas, P., Lippel, St-Onge, Gervais, Boucher, Bernard, & Lavoie, (1999). Vers une indemnisation équitable des déficiences, des incapacités et des situations de handicap; document de réflexion. Présenté dans le cadre du colloque de l'Office des personnes handicapées du Québec **"Après 20 ans , assurer l'avenir ; vers une compensation équitable des besoins des personnes handicapées."** Québec: Laboratoire de recherche sociale, IRDPQ.

Freire, P. (1992). **Education for critical consciousness**. New York, NY: Continuum.

Gadacz, R. (1994). **Re-thinking dis-ability: New structures new relationships**. Edmonton, AB: Alberta University Press.

Gagnon, L. (1996). Une éducation rose et handicapée: Un autre example de double discrimination. **Women's Education des Femmes, 12**(2), 35-36.

Gibson, C. (1993). Towards a broader conceptualization of distance education. In D. Keegan (Ed.). **Theoretical principles of distance education** (pp. 81-92). N.Y.: Routledge.

Giudice, B. (2000). France plans to create an internet university. **The Chronicle of Higher Education**, May 17, 2000. Available June 15, 2000 on the World Wide Web: http://chronicle.com/free/2000/05/2000051702t.htm

Gladhart, M.A. (1999, May 22). **Disabilities in higher education** (citations of Lissner, 1995, Digest and Education Statistics, 1997, and Greene & Zimbler, 1989). Available from: <EASI@MEALSTROM.STJOHNS.EDU>, <mgladhar@WSUHUB.UC.TWSU.EDU>.

Gladieux, L.E., & Swail, W.S. (1999, April). **Policy perspectives: The virtual university and educational opportunity - Issues of equity and access for the next generation**. [booklet]. The Washington Office of the College Board. Available address: 1233 20th St. NW, Suite 600, Washington, DC 20036-2304. Available on the World Wide Web: <www.collegeboard.org>.

Glass, C.R., Knight, L.A. (1988). Cognitive factors in computer anxiety. **Cognitive Therapy & Research, 12**(4), 351-366.

Gnanafihamany, T. (1999). **The Alberta Ministry of Advanced Education and Career Development – Student enrolments for 1997**. Received by e-mail from: <tony.gnanafihamany@aecd.gov.ab.ca>.

Gold, J. A. (1997, November). Does CMC present individuals with disabilities opportunities or barriers? **CMC Magazine**. Available on the World Wide Web: http://www.december.com/cmc/mag/1997/jan/gold.html.

Goodman, G. (2000). **Factors that influence post-secondary students with disabilities to adopt or reject assistive technology for computer access**. Proceedings of the CSUN 2000 Conference. Available on the World Wide Web: http://www.csun.edu/cod/conf2000/proceedings/0015Goodman.html.

Goundry, S. & Peters, Y. (1994). **Litigation for equality rights: The promise and pitfalls**. Winnipeg, Manitoba: Canadian Disability Rights Council.

Gouvier, W.D., Coon, R.C., Todd, M.E., & Fuller, K.H. (1994). Verbal interactions with individuals presenting with and without physical disability. **Rehabilitation Psychology, 39**(4), 263-268.

Government of Canada (1993). **Persons with disabilities in Canada: 1986 Statistics and bibliography.** Ottawa, Ontario: Minister of Supply and Services Canada.

Government of Canada (1996, Oct.). **Equal citizenship for Canadians with disabilities.** Ottawa: Federal Task force on Disability Issues: Canada.

Government of Canada (1999). **Future directions.** Ottawa, Hull: Human Resources Development Canada. Catalogue number MP80-2/11-1999E.

Greene B. & Zimbler, L. (1989). **Profile of handicapped students in postsecondary education, 1986: National Postsecondary Aid Study survey report.** Washington: Superintendent of documents, US Government Printing office, Washington DC 20402.

GVU (1997). **GVU's 8th WWW User Survey.** Retrieved in March 1998 from the World Wide Web: http://www.gvu.gatech.edu/user_surveys/survey-1997-10/.

GVU (1998). **GVU's 9th WWW User Survey.** Retrieved January 25, 1999 from the World Wide Web: http://www.gvu.gatech.edu/user_surveys/survey-1998-04/

Hahn, H., (1985, Jan/Feb). Disability policy and the problem of discrimination. **Behavioral Scientist, 28**(3).

Hahn, H. "The H Factor" in the ICIDH: What's left of the original concept? **ICIDH Environmental Factors International Network, 8**(3), 31-41.

Harder, L. & Doe, T. (Eds.). (1989). **Focus on ability.** (Focus series). Edmonton: University of Alberta Career and Placement service.

Hart, K. E. & Stevens, K. (1995). The use and evaluation of video supplements in the teaching of introductory psychology. **Journal of Instructional Psychology, 22**(2), 103-114.

Harvey, I. (1999). Virtual exclusion? High tech designs often ignore needs of disabled. (1999, Sept 15) **The Calgary Sun.**

HEATH (Higher Education and the Handicapped Resource Center) (1999, June). HEATH's panel at the American Council on Education's annual meeting: A discussion of timely disability issues. Retrieved August 23, 1999 on the World Wide Web: http://www.acenet.edu/about/programs/access&equity/heath/newsletter/1999/06june/meeting.htm

Heinssen, R. K., Glass, C.R., & Knight, L.A. (1987). Assessing computer anxiety: Development and validation of the Computer Anxiety Rating Scale. **Computers in Human Behavior, 3**(1), 49-59.

Henderson, C. (1992). **College freshmen with disabilities: A statistical profile.** Washington, DC: HEATH Resource Centre, American Council on Education.

Henderson, C. (1995). **College freshmen with disabilities: A triennial statistical profile.** Washington DC: HEATH Resource Center.

Henderson, C. (1999). **College freshmen with disabilities: A biennial statistical profile** (Statistical Year 1998). Washington DC: HEATH Resource Center. Retrieved January 31, 2000 on the World Wide Web: www.heath-resource-center.org

Henter-Joyce, Inc. (1998). **JAWS for Windows** (Version 3.2 - Demo) [Computer software - CD ROM]. St.-Petersburg, FL: Author. Available: World Wide Web, http://www.hj.com.

Higgins, E. L. & Zvi, J.C. (1995). Assistive technology for postsecondary students with learning disabilities: From research to practice. **Annals of Dyslexia, 45,** 123-142.

High Tech Center Training Unit (1999, August). **Distance education: Access guidelines for students with disabilities.** Retrieved September 16, 1999 on the World Wide Web: http://www.htctu.fhda.edu/dlguidelines/final%20dl%20guidelines.htm

Hill, J.L. (1992). Accessibility: Students with disabilities in universities in Canada. **Canadian Journal of Higher Education, 22**(1), 48-83.

Hill, J.L. (1996). Speaking out: perceptions of students with disabilities at Canadian universities regarding institutional policies. **Journal of Postsecondary Education and Disability, 11**(1), 1-13.

Hoadley, C. M., Hsi, S., Berman, B. P. (1995). The multimedia forum kiosk and Speakeasy. **Proceedings of ACM Multimedia 1995** (pp. 363-364). New York: ACM Press.

Hopps, S. & Pepin, M. (1999). Self-reported impact of the internet on people with physical disabilities. Presentation at the American Psychological Association annual Convention, August, Boston. **Abstracted in Rehabilitation Psychology**, **1999**, **44**(3), 304.

Horn, C.A. & Shell, D.F. (1990). Availability of computer services in postsecondary institutions: Results of a survey of AHSSPPE members. **Journal of Postsecondary Education and Disability**, **8** (1), 115-124.

Horn, L. & Berktold, J. (1999). **Students with disabilities in postsecondary education: a profile of preparation, participation and outcomes**. (NCES 1999-187). Washington, DC: U.S. Department of Education - National Center for Education Statistics.

Hubka, D. & Killean, E. (1996). **Employment opportunities for post-secondary students and graduates with disabilities: A national study**. Ottawa: National Educational Association of Disabled Students.

Hubka, D. & Killean, E. (1999). **Working towards a coordinated national approach to services, accommodations and policies for postsecondary students with disabilities: Ensuring access to higher education and career training**. Ottawa: National Educational Association of Disabled Students.

Hudiburg, R.A., Ahrens, P.K., & Jones, T.M. (1994). Psychology of computer use: XXXI. Relating computer users' stress, daily hassles, somatic complaints, and anxiety. **Psychological Reports**, **75**(3, Pt 1), 1183-1186.

Human Resources Development Canada. (1998). **In unison: A Canadian approach to disability issues - A vision paper**. Cat. No.: SP-113-10-98E, ISBN 0-662-2730-6, Available on the World Wide Web: http://socialunion.gc.ca

Human Resources Development Canada. (1999). **Canada Student Loans Program 1999-2000**, Ottawa: Author.

Hurst, D. & Smerdon, B. (2000). **Postsecondary students with disabilities: Enrollment, services, and persistence** (Stats in Brief). Students with disabilities in postsecondary education: a profile of preparation, participation and outcomes. Washington, DC: U.S. Department of Education - National Center for Education Statistics.

IBM. (1999). **IBM special needs system**. Retrieved August 26, 1999 on the World Wide Web: http://www.austin.ibm.com/sns/index.html.

IBM. (2000). **IBM special needs systems guidelines**. Retrieved March 26, 2000 on the World Wide Web: http://www-3.ibm.com/able/guidelines.htm

Icom' Centre de ressources informatiques (2000). Website: http://www.handicap-icom.asso.fr/accueil.html

Info-route sur la déficience vers l'intégration et l'éducation (2000). Website: http://laurence.canlearn.ca/Francais/apprend/newguidedaccessibilite/indie/in

IT Spending Forecast for Higher Education Institutions, 1998-03 (1999). Edupage: http://sunsite.sut.ac.jp/edupage/latest.html

Jacques Joly Consultant Inc. (1999). **Étude des besoins du réseau d'enseignement collégial en matière de matériel didactique. Rapport présenté au Centre collégial de développement de matériel didactique (CCDMD).** Montréal: Centre collégial de développement de matériel didactique (6220, rue Sherbrooke Est, bureau 416, Montréal (Québec) H1N 1C1.

Jacobs, S. (1999). Section 255: Fueling the creation of new electronic curbcuts. **TIA (Telecommunications Industry Association) Access,** 07/16/99. Retrieved December 5, 1999 on the World Wide Web: http://www.[illegible]online.org/access.

Jeffrey, J. A. (1996, Winter). Integrating the student with a disability into student media. **College Media Review, 33**(4),19-21.

Johnson, E. (1993) Open doors to disabled workers. In M. N. Nagler (Ed.), **Perspectives on disability** (pp. 475-479). Palo Alto, CA: Health Markets.

Johnson, D.W. & Johnson, R.T. (1994). **Learning together and alone: Cooperative, competitive and individualistic learning** (4th ed.). Boston, MA: Allyn and Bacon.

Judd, D., Tagalakis, V., & Fichten, C.S. (1988). **Interpersonal Cues Interview: Coding manual.** Technical manual, Dawson College: Montreal.

Juhel, J.C. (2000). **Étudiants handicapés dans les cégeps de l'Est - Automne 99**. Québec, Québec: Le Services aux étudiants handicapés du Cégep de Sainte-Foy.

Kaye, H.S. (2000). **Computer and internet use among people with disabilities. Disability statistics report (13).** Washington DC: U.S. Department of Education, National Institute on Disability and Rehabilitation Research. Abstract available June 13, 2000 on the World Wide Web: http://www.dsc.ucsf.edu/UCSF/pub.taf?_UserReference=A96FCA36DBF740C0BCBAFAA7&_function=search&recid=112&grow=1

Keeler, C.M. & Anson, R. (1995). An assessment of cooperative learning used for basic computer skills instruction in the college classroom. **Journal of Educational Computing Research**, **12**(4), 379-393.

Keillor, M. (1998). **Technical support; The Nat Christie Adaptive Technology Center**. Presentation at the annual CADSPPE Conference, Ottawa, ON.

Kirkup, G. (1999). A computer of one's own (with an internet connection). **Adults Learning**, **10**(8), 23-25.

Kruger, A. R. (1994a). A collaborative approach to focus groups (pp. 187-209). In **Focus groups: A practical guide for applied research**. London: Sage Publications.

Kruger, A. R. (1994b). Principles of analyzing focus group results (pp. 127-139). In **Focus groups: A practical guide for applied research**. London: Sage Publications.

La surdité au Québec (2000). Website: http:// www.surdite.org/

Labrèche, S. (2000). Les Québécois sont encore réticents à acheter en ligne. March 4, 2000. **Les Affaires**, p.42.

Lance, D. (2000). **Technology planning for student with disabilities**. Available on the World Wide Web: http://millinium.aed.org/lance.shtml.

Lance, G. D. (1996). Computer access in higher education: A national survey of service providers for students with disabilities. **Journal of College Student Development**, **37**(3), 279-288.

Landerholm, E. (1995). Early childhood teachers' computer attitudes, knowledge, and practices. **Early Child Development & Care**, **10**(9), 43-60.

Larouche, M. (1992, July). **Document de réflexion: Quelques donnees sur les besoins associatifs des femmes handicapées du Québec**. Quebec: Secrétariat d'etat du Canada, Région Quebec: Programmes de participation des personnes handicapées et programmes de promotion de la femme.

Lavers, J. (1999, February 15). **List of English institutions and their students with disabilities statistics**. Received on February 15, 1999 by e-mail from: <mclv@musica.mcgill.ca>.

Lavoie, H. (1986). **Expérience d'intégration des personnes atteintes de déficience sensorielle profonde: Rapport d'évaluation.** Québec: D.G.E.C.

Learning Disabilities Association of Canada (1996). **Learning technologies and persons with learning disabilities: Annotated bibliography.** Office of Learning Technologies - Human Resources Development Canada. Retrieved May 12, 1999 from the World Wide Web: http://olt-bta.hrdc-drhc.gc.ca/publicat/bibldise.html.

Learning Disabilities Association of Canada. (2000). **Defining learning disabilities**. Retrieved March 26, 2000 on the World Wide Web: http://educ.queensu.ca/~lda/ldac/ldacdefn.htm

Leblanc, A. (1999). **Integration of students with disabilities in the CEGEP network of Quebec: A historical overview and case study.** M.Ed. thesis, Faculty of Education, Université de Sherbrooke, Sherbrooke, Québec.

Lee, L. (1999). **On line, in business, at home: Final report to the Office of Learning Technologies** Ottawa: Human Resources Development Canada. [Internet] Available World Wide Web: http://olt-bta.hrdc.gc.ca/publicat/olaexe.html.

Leitch, D. A. (1995, Nov.). **Canadian universities: The status of persons with disabilities.** Unpublished manuscript, Halifax, NS: Saint Mary's University.

Lemieux-Brassard, L. (1996). What characteristics would the revised version of the international classification of impairment, disabilities and handicap have to have in order that it get our support? **ICIDH Environmental Factors International Network**, **8**(3), 19-21.

Lemieux-Brassard, L. (2000). **Another step toward independent living: Montreal independent living resource centre (ILRC) feasibility study - Report prepared for the Canadian Association of Independent Living Centres**. Available June 15, 2000 via e-mail: Deborah Kennard, Co-chairperson, Montreal ILRC Feasibility Study, d.kennard@videotron.ca

Lewis, L. & Farris, E. (1999). **An institutional perspective on students with disabilities in postsecondary education** (No. 1999-046). Washington, DC: NCES, U.S. Department of Education, National Center for Education Statistics. Retrieved April 12, 2000 on the World Wide Web: <http://nces.ed.gov/pubs99/1999046.pdf>

Lewis, R.B. (1998). Assistive technology and learning disabilities: Today's realities and tomorrow's promises. **Journal of Learning Disabilities**, **31** (1), 16-26.

Libman, E., & Fichten, C.S. (1996a). **Sleep, insomnia and aging - How to recognize a sleep problem and what to do about it.** (68 pages) [Manual.] Montreal, QC, Sir Mortimer B. Davis - Jewish General Hospital. ISBN 2-9803316-2-7.

Libman, E., & Fichten, C.S. (1996b). **The professional's guide to: Sleep, insomnia and aging - How to recognize a sleep problem and what to do about it.** (11 pages) [Manual.] Montreal, QC, Sir Mortimer B. Davis - Jewish General Hospital. Montreal, QC, Sir Mortimer B. Davis - Jewish General Hospital. ISBN 2-9803316-2-8.

Libman, E., & Fichten, C.S. (de concert avec le service de dysfonction sexuelle). (1989a). **Guide de comportement pour une vie sexuelle satisfaisante à la suite d'une prostatectomie transurétrale (2nd ed.).** [Booklet.] (ISBN 29801564-2-6). Montréal: l'Hopital général juif - Sir Mortimer B. Davis.

Libman, E., & Fichten, C.S. (de concert avec le service de dysfonction sexuelle). (1989b). **Quelques faits et données au sujet de la prostate, de ses problèmes, et de la prostatectomie transurétrale (2nd ed.).** [Booklet.] (ISBN 2-9801564-3-4). Montréal: l'Hopital général juif - Sir Mortimer B. Davis.

Libman, E., & Fichten, C.S. (with the collaboration of the Sexual Dysfunction Service). (1989c). **A behavioral guide to good sex after transurethral prostatectomy. (2nd ed.).** [Booklet.] Montreal: Sir Mortimer B. Davis - Jewish General Hospital.

Libman, E., & Fichten, C.S. (with the collaboration of the Sexual Dysfunction Service). (1989d). **Some facts and figures about the prostate, its problems, and transurethral prostatectomy (2nd ed.).** [Booklet.] Montreal: Sir Mortimer B. Davis - Jewish General Hospital.

Louis Harris & Associates. (1994). **N.O.D./Harris survey of Americans with disabilities.** N.Y.: Louis Harris & Associates.

Lowney, G. C. (1995, Nov.). **Focussing on accessibility barriers.** Available on the World Wide Web: http://microsoft.com/devnews/archive/barrier4.htm.

LTReport. (1999, April). The laptop college. **Learning Technologies Report**. Retrieved March 13, 1999 on the World Wide Web: http://node/on.ca/ltreport

MacArthur, C. A., Graham, S., Haynes, J. B., & DeLaPaz, S. (1996). Spelling checkers and students with learning disabilities: Performance comparisons and impact on spelling. **Journal of Special Education**, **30**(1), 35-57.

Margolis, V. H. (1995, Nov.). **Computer access project.** Unpublished manuscript. Garden City, NY: Nassau Community College.

Martino, L. & Johnson, D. W. (1979). Interaction between handicapped and non-handicapped teenagers as a function situational goal structuring: Implications for mainstreaming. **American Educational Journal**, **16**(2), 161-167.

Mathie, V. A. (1996, Aug.). **Teaching and technology: Discovering the magic, avoiding the pitfalls.** Presentation at the American Psychological Association Annual Convention. Toronto, ON. (Available from the author at: <andreova@jmu.edu>)

McGill, J. Roberts, S. & Warick, R. (1994). **Post-secondary education and persons with disabilities: Canadian annotated Bibliography.** Vancouver B.C.: Disability Resource Center, University of British Columbia.

McKeachie, W.J. (1994). **Teaching tips: Strategies, research, and theory for college and university teachers** (9th ed.). Toronto: D.C. Heath and Company.

McKeachie, W. J., Pintrich, P. R., Lin, Y-G., Smith, D. A. F., & Sharma, R. (1990). **Teaching and learning in the college classroom: A review of the research literature** (2nd ed.). Ann Arbor, MI: University of Michigan.

Mercier, N. (1999, March 24). Les nouvelles technologies à l'UQAM - Télé-professeur. Aventure **Électronique**, 10-11.

Meyer, B., Sit, R.A., Spaulding, V.A., Mead, S.E., & Walker, N. (1997). Age group differences in word wide web navigation. **CHI 97 Electronic Publications: Late-Breaking/Short Talks**. Available April 16, 2000 on the World Wide Web: http://www.acm.org/sigchi/chi97/proceedings/short-talk/bm.htm

Microsoft Corporation (1999a). **Accessibility & Microsoft: Microsoft accessibility technology for everyone.** Retrieved from the World Wide Web: http://www.microsoft.com/enable/microsoft/default.htm.

Microsoft Corporation (1999b). **Accessibility & Microsoft: What is accessibility?** Retrieved June 6, 1999 from the World Wide Web: http://www.microsoft.com/enable/microsoft/overview.htm.

Ministère de l'éducation - Enseignement supérieur (Gouvernement du Québec) (1998). **The Relance survey of college graduates - Graduating classes of 1994-95-96-97.** [brochure] Available Internet Address: http://www.meq.gouv.qc.ca/ens-sup (under Enseignement collégial, La relance au collégial).

Ministère de l'éducation - Enseignement supérieur (Gouvernement du Québec). (2000). **Nombre d'élèves inscrits au collégial à l'enseignement ordinaire et à temps plein, selon le type de formation et la classe: Observations (1993-1998) et prévisions pour chacun des trimestres d'automne (1999-2008)**. Available June 24, 2000 on the World Wide Web: http://www.meq.gouv.qc.ca/ens-sup/ens-coll/sipeec/Reseau%20public.htm

Ministère de l'éducation du Québec (1994). **Programme Allocation pour les besoins particuliers des étudiants atteints d'une déficience fonctionnelle majeure. Recueil des Règles Administratifs.** Québec: Ministère de l'éducation du Québec.

Ministère de l'éducation du Québec, Direction générale de l'aide financière aux étudiants. (1995). **Aide financière aux étudiants - Pour les personnes atteintes d'une déficience fonctionnelle / Student financial aid program - Students with functional disabilities.** Québec: Ministère de l'éducation du Québec.

MEQ Ministère de l'éducation du Québec. (1998). **Accessibilité au collégial des personnes handicapées, des autochtones, des membres des communautés culturelles et des personnes participant au programme sport-études** (CT" 192640). Québec: MEQ Ministère de l'éducation du Québec.

Ministres fédéral, provinciaux et territoriaux responsables des services sociaux. (1998). **À l'unisson: Une approche canadienne concernant les personnes handicapées**. Available on the World Wide Web: http://socialunion.gc.ca./pwd/unison/unison_f.html

Montali, J. & Lewandowski, L. (1996). Bimodal reading: Benefits of a talking computer for average and less skilled readers. **Journal of Learning Disabilities**, **29**(3), 271-279.

Morgan, C.D. (1988). **Focus group as qualitative research: Qualitative research methods**. London, UK: Sage publication.

MSSS. (1992). **La politique de la santé et du bien-être**. Québec: Gouvernement du Québec.

Nagler, M. (1993). The disabled: The acquisition of power. In M. Nagler (Ed.), **Perspectives on disability** (2nd. Edition) (pp. 33-36). Palo Alto, CA: Health Markets Research.

National Organization on Disability (1999, Spring). Education and disability. Disability Agenda: A **Quarterly Publication Of The National Organization On Disability,** 3(4).

National Telecommunications and Information Administration. (1999). **Falling through the net: defining the digital divide**. Washington, D.C.: National Telecommunications and Information Administration, U.S. Department Of Commerce. Available June 13, 2000 on the World Wide Web: http://www.ntia.doc.gov/ntiahome/digitaldivide/index.html

NCAM (National Center for Accessible Media). (2000). **Media access generator** (MAGpie). Retrieved April 8, 2000 on the World Wide Web: <http://www.wgbh.org/wgbh/pages/ncam/webaccess/magindex.html>

NCAM/WGBH Educational Foundation. (1999). **CD-ROM Access Project**. Retrieved September 21, 1999 on the World Wide Web: http://www.wgbh.org/wgbh/pages/ncam/cdrom/aboutproject.html.

NEADS (1998, January). **National approach to services project - questionnaire.** Available Web Site: http://www.indie.ca/neads. Available address: NEADS, 4th Level Unicentre, Carleton University, 1125 Colonel By Drive, Ottawa, Ontario, Canada, K1S 5B6. Available phone number (alternate formats): (613) 526-8008.

Neil Squire Foundation. (1999). **Neil Squire Foundation web site**. Retrieved August 22, 1999 on the World Wide Web: < http://www.neilsquire.ca/>.

Newroe, K. (1991, Mar.). **Telecommunication technologies to deliver assistive technology services.** Unpublished manuscript. Washington, DC.: RESNA Technical Assistance Project.

NODE Networking. (1998, August). **Universal design for the information highway**. Available on the World Wide Web: http://node.on.ca/networking/august1998/feature1.html.

Norris, A. (1999, May 29). Anglo = English speaker? **The Gazette**, p. A13.

Nova Scotia Community College (1999). **Nova Scotia Community College – student enrolments.** Retrieved January 4, 1999 from the World Wide Web: http://www.nscc.ms.ca

Office des Personnes Handicapées du Québec (OPHQ) (1984). **À part Ègale: L'intégration sociale des personnes handicapées: un défi pour tous**. Drummondville, Québec: OPHQ.

Office des personnes handicapées du Québec. (1995). **États généraux sur l'éducation - Mémoire. Drummondville: Office des personnes handicapées du Québec**. Abstract available June 13, 2000 on the World Wide Web: http://www.ophq.gouv.qc.ca/Position/D_Etatsmem.htm

Office des personnes handicapées du Québec. (1997a). **Forum sur le développement social : la participation sociale du point de vue des personnes handicapées - Commentaires de l'Office des personnes handicapées du Québec sur la démarche et certaines questions soulevées par le Conseil de la santé et du bien-être**. Drummondville: Office des personnes handicapées du Québec. Abstract available June 13, 2000 on the World Wide Web: http://www.ophq.gouv.qc.ca/Position/D_Etatsint.htm

Office des personnes handicapées du Québec. (1997b). **Mémoire «Loi sur l'instruction publique» - Position de l'Office des personnes handicapées du Québec concernant l'avant-projet de loi modifiant la Loi sur l'instruction publique**. Drummondville: Office des personnes handicapées du Québec. Abstract available June 13, 2000 on the World Wide Web: http://www.ophq.gouv.qc.ca/Position/D_Instruction.htm

Office des personnes handicapées du Québec (2000). Website: http://www.ophq.gouv.qc.ca/

Office of Learning Technologies (1998). **New learning technologies and media in Québec: Profile and positioning of the main stakeholders.** Ottawa: Human Resources development Canada.

Office of Learning Technologies: Human Resources Development Canada. (1998). **Effectiveness of learning technologies: The costs and effectiveness of technology-based approaches to teaching and learning**. Retrieved July 4, 1999 on the World Wide Web: http://olt-bta.hrdc-drhc.gc.ca/publicat/OPASexece.html.

Oliver, M., & Zarb, G (1989). The politics of disability: A new approach. **Disability, Handicap & Society**, **4**, 221-239.

Oliver, M. (1990). **Politics of disablement.** London: Macmillan.

Oliver, M. (1996). **Understanding disability from theory to practice**. New York, NY: St. Martin Press.

Oliver, M. (1999). **Disabled people and the inclusive society: Or the times they really are changing**. Public lecture on behalf of Strathclyde Centre for Disability Research and Glasgow City Council. Retrieved on April 28, 2000 from the World Wide Web: http://www.gre.ac.uk/~sd04modern/times.html.

Ontario March of Dimes. (1999). **Evaluating the impact of voice recognition software on competitive employment for people with physical disabilities. Final report to the Office of Learning Technologies**. Ottawa: Human Resources Development Canada.

Oregon State University (1999a, March). **Distance education and individuals with disabilities - Technology access program.** [brochure] Available e-mail address: <stawarro@ccmail.orst.edu> Available phone number: (541) 737-7307.

Oregon State University (1999b, March). **Oregon state university www accessibility guidelines - Technology Access Program**. [brochure] Available e-mail address: <stewarro@ccmail.orst.edu> Available phone number: (541) 737-7307.

Oregon State University. (1999c, March). **Oregon State University hardware access guidelines**. Available e-mail address: stewarro@ccmail.orst.edu.

Oregon State University. (1999d, March). **Oregon State University software access guidelines**. Available e-mail address: stewarro@ccmail.orst.edu.

O'Rourke J. & Schachter, L. (1997, March). **Promise and prospect of the new learning technologies for adult learning opportunities for women.** Final draft of a discussion paper prepared for CCLOW (Canadian Congress for Learning Opportunities for Women).

Osman, L. M. & Muir, A. L. (1994). Computer skills and attitudes to computer-aided learning among medical students. **Medical Education, 28**(5), 381-385.

Papineau, W. & Lohr, J.M. (1981). Effects of sensory modality for presentation and word imagery on paired-associate learning. **Perceptual and Motor Skills**, **52**, 747-750.

Paul, D. (1994, April). An integration/service model that works. **T.H.E. Journal** [On-line serial]. Available Web site: http://www.thejournal.com/past/April/44paul.html.

Pea, R. D. (1994). Seeing what we build together: Distributed multimedia learning environments for transformative communication. **Journal of the Learning Sciences**, **3**(3), 283-299.

Pell, S.D., Gillies, R.M., & Carss, M. (1997). Relationship between use of technology and employment rates for people with physical disabilities in Australia: Implications for education and training programmes. **Disability and Rehabilitation**, **19** (8), 332-338.

Pettigrew, P.S. (1998, Nov.). **Notes for remarks by the Honourable Pierre S. Pettigrew of Human Resources Development Canada to the National Educational Association of Disabled Students**. Presentation at the National Educational Association of Disabled Students (NEADS) Biannual Conference, Ottawa, Canada

Phonak (2000). **FM Communication: A new standard in FM technology**. Retrieved March 26, 2000 on the World Wide Web: http://www.phonak.com/stop/113.html

Plass, J.L., Chun, D.M., Mayer, R.E., & Leutner, D. (1998). Supporting visual and verbal learning preferences in a second-language multimedia learning environment. **Journal of Educational Psychology**, **90**, 25-36.

Poulsen, C. (1994). Enhancing classroom climate and achievement through cooperative learning. **Quebec Association for Adult Learning**, **12**(4), 2-3.

PricewaterhouseCoopers (2000). **Canadian consumer technology study**. Available March 18, 2000 on the World Wide Web: <http://www.pwcglobal.com/extweb/ncsurvres.nsf/0cc1191c627d157d8525650600609c03/8945bb1ee560f32d852568600078c099/$FILE/ccts_99.pdf>

Price, R. & Winiecki, D. (1995). Attitudes and skill levels of college students entering a typical introductory college computing course. **Journal of Computing in Teacher Education**, **12**(1), 20-25.

Priestly, M. (1998). Constructions and creations: Idealism, materialism and disability theory. **Disability & Society**, **13**(1), 75-94.

Raskind, M.H. & Higgins E.L. (1998). Assistive technology for postsecondary students with learning disabilities: An overview. **Journal of Learning Disabilities**, **31**(1), 27-40.

Reid, J.M. (1987). The learning style preferences of ESL students. **TESOL Quarterly**, **21**(1), 87-111.

Répertoire canadien des organismes de personnes handicapées (2000). Website: http://www.cegep-st-jerome.qc.ca/tes/PERHAND.htm

Rioux-Marchand (1994). **The Canadian disability resource program: Offsetting costs of disability and assuring access to disability related support (An occasional paper from l'Institut Roeher).** North York, ON: Roeher Institute.

Robbins, C. (1996). Computer technology education and the deaf student: Observations of serious nuances of communication. **Information, technology and disabilities**, **3**(4).

Rockman, S. (1992). **Learning from technologies: A perspective on the research**. Unpublished manuscript.

Roeher Institute. (1996, September). **Learning technologies and people with disabilities: Annotated bibliography.** Office of Learning Technologies - Human Resources Development Canada Available on the World Wide Web: http://olt-bta.hrdc-drhc.gc.ca/publicat/bibdisab.html.

Rosen, L. & Weil, M.M. (1995). Computer anxiety: A cross-cultural comparison of university students in ten countries. **Computers in Human Behavior**, **11**(1), 45-64.

Roulstone, A. (1998). Researching a disabling society: The case of employment and new technology. In T. Shakespeare (Ed.), **The disability reader: A social science perspective** (pp. 110-127). New York: Cassell.

Russell, T.L., (1997). **No significant difference phenomenon** (parts 1, 2, and 3). Retrieved August 25, 1999 on the World Wide Web: http://www.krwebdesign.com/data/nosigdif.htm

Russell, T.L., (1999). **No significant difference phenomenon** (4th edition). Retrieved August 25, 1999 on the World Wide Web: http://cuda.teleeducation.nb.ca/nosignificantdifference/

Santa Monica College. (1999a). **Some universal design challenges.** Retrieved April 18, 1999 from the World Wide Web: http://www.smc.edu/centers/disabledstudent/challenges_for_universal_design.htm

Santa Monica College. (1999b, March). **Universal access to Santa Monica College web pages** Available World Wide Web: http://www.smc.edu/centers/disabledstudent/awareness_training.htm

Saskatchewan Institute of Applied Science and Technology. (1998). **Annual monitoring report.** (submitted to the Saskatchewan Human Rights Commission, September 30, 1998). Available address: SIAST administrative offices, 400-119 4th Avenue South Saskatoon, SK, S7K 5X2. Available phone number: (306) 933 7328. Available fax number: (306) 933 7323.

Savard, M., Mitchell, S., Abrami, P.C., & Corso, M. (1995). Learning together at a distance. **Canadian Journal of Educational Communication**, **24**, 115-128.

Schneider, M. (2000). **Geo-able listserve**. Available at: GEOGABLE@LSV.UKY.EDU.

Schoen, E. Uysal, M. C.D. McDonald (1987). Attitude of faculty members toward treatment of disabled students re-examined. **College Student Journal**, **21,** 190-193

Schoffro, M. J. (1996). Internet empowerment. **Disability Today**, **5**(3), 70-71.

Schofield, J. (1999). Back to school online. **Maclean's**, September, 22-26

Scott, S. (1996). Using collaboration to enhance services for college students with learning disabilities. **Journal of Postsecondary Education and Disability**, **12**(1), 10-21.

Scott, W. (1996). **The accessible Canadian library II: A resource tool for libraries serving persons with disabilities**. Ottawa: National Library of Canada.

SEDA (1996). **Staff and Education Development Association.** Available Web site: http://www.seda.demon.co.uk

Senécal, J. (2000a). **Global de la clientèle desservie pour la région ouest (SAIDE) à la session automne 1999**. Montréal: Service d'Aide à l'Intégration Des Élèves (SAIDE), Cégep du Vieux Montréal.

Senécal, J. (2000b). **Insérez, dès maintenant, ces pages mises à jour en enlevant les pages désuètes de votre document " Dossier : Prêt ou acquisition d'un appareil" qui vous été remis en mai 1999: Parc mobile des appareils (Annexe 2).** May 10, 2000. Montréal: Service d'Aide à l'Intégration Des Élèves (SAIDE) - Cégep du Vieux Montréal.

Shashaani, L. (1997). Gender differences in computer attitudes and use among college students. **Journal of Educational Computing Research**, **16**(1), 37-51.

Shell, D.F., Horn, C.A., & Severs, M.K. (1988). Effects of a computer-based educational center on disabled student's academic performance. **Journal of College Student Development**, **29** (5), 432-440.

Schauer, J., Barnicle, K., Vanderheiden, G.C. (2000). Facilitating the development of cross-disability accessible products: The product design/interface evaluation toolkit. **CSUN 2000 Conference Proceedings.** Available: Trace Research and Development Center, 5901 Research Park Blvd., Madison, WI 53719. Available on the World Wide Web: http://www.csun.edu/cod/conf2000/proceedings/0110Schauer.html

Shultz, T.R. (1998). **McGill machine survey.** Retrieved December 13, 1998 from the World Wide Web: http://www.mcgill.ca/temporary/survey.htm

Shumila, D. & Shumila, J. (1998). **A review of online education for students with print impairments.** CSUN 98 Papers. Retrieved October 3, 1998 from the World Wide Web: http://www.dinf.org/csun_98/csun98_090.htm.

Sinks, S. & King, J. (1998). **Adults with disabilities: Perceived barriers that prevent internet access.** Presentation at the annual conference of CSUN (California State University, Northridge): Technology and persons with disabilities - Where assistive technology meets the information age. Los Angeles. Retrieved August 23, 1999 on the World Wide Web: http://www.dinf.org/csun_98/csun98_152.htm.

Site internet pour l'éducation spécialisée (Michel Landry : CVM) (2000). Website : http://pages.infinit.net/eduspe/index.htm

Smith, J.O. (1993). Self-reported written language difficulties of university students with learning disabilities. **Journal of Postsecondary Education and Disability**, **10**(3), 1-10.

Smither, J. (1995). **Assessment of availability and use of assistive technology for the disabled: Report to the State of Florida's Commission on long term care.** Unpublished manuscript, Orlando Florida.

Smither, J. & Guillermo, N. (1996, Aug.). **Assessment of the availability and use of assistive technology for the disabled.** Presentation at the annual meeting of the Association for the Advancement of Behaviour Therapy, Toronto.

SNOW (Special Needs Opportunity Windows) Project. (undated). **SNOW web page**. Retrieved August 20 on the World Wide Web: < http://snow.utornoto.ca>.

Spertus, E. (1991). **Why are there so few female computer scientists?** Available on the World Wide Web: http://www.ai.mit.edu/people/ellens/Gender/pap/pap.html.

Staff Writers. (1998). **New learning technologies and learners with disabilities resources**. The NODE Forums. Retrieved November 30, 1998 from the World Wide Web: http://node.on.ca/abilities/resources.html.

Staff Writers. (1998). **Nouvelles technologies d'apprentissage et les apprenant(e)s ayant une incapacité.** The NODE Forums. Retrieved November 30, 1998 from the World Wide Web: http://node.on.ca/abilities/ressources.html.

Stahlman, J. (2000). Students per capita in major cities. **The Gazette**, January 13, p. A1.

Statistical snapshot: the nature of disability. (1999, Spring). **Disability Agenda: A quarterly Publication of the National Organization on Disability**, **3**(4), 3-4.

Statistics Canada (1992). **Full-time enrolment by level, province, institution, and sex, 1991-1992** (Universities: Enrolment and Degrees pp. 30 -41, Cat. No. 81-204). Ottawa, Ontario: Statistics Canada.

Statistics Canada (1998). **Internet use by households.** Retrieved April 27, 1999 from the World Wide Web: http://www.statcan.ca/Daily/English/990423b.htm.

Statistics Canada (1999a). Institutions, enrolments and teachers, 1996-97 to 1998-99 - Table 1. **Education Quarterly Review**, **5**(3), 56-57. Statistics Canada Catalogue no. 81-003.

Statistics Canada (1999b). **Canadian statistics: Education: Enrolment**. Retrieved August 11, 1999 on the World Wide Web: <http://www.statcan.ca/english/Pgdb/People/educat.htm>.

Statistics Canada (1999c). **Education at a glance.** Education Quarterly Review - Cat. No. 81-003, Vol. 5 (3), Pp. 63-65. Ottawa, Ontario: Statistics Canada.

Statistics Canada (1999d). **Highlights: Determinants of postsecondary participation** (Education Quarterly Review - Cat. No. 81-003, Vol. 5 (3), Pp. 7). Ottawa, Ontario: Statistics Canada.

Statistics Canada. (1999e). Computer technology in schools. **The Daily**. October 12, 1999. Available June 13, 2000 on the World Wide Web: http://www.statcan.ca/Daily/English/991012/d991012a.htm

Statistics Canada. (2000a). **Population by age group (1999)**. Retrieved June 22, 2000 on the World Wide Web: http://www.statcan.ca/english/Pgdb/People/Population/demo31b.htm

Statistics Canada. (2000b). **Community college postsecondary enrolment (1993-1997 both sexes).** Retrieved June 22, 2000 on the World Wide Web: http://www.statcan.ca/english/Pgdb/People/Education/educ02a.htm

Statistics Canada (2000c). **University enrolment, full-time and part-time, by sex (1993-1997 both sexes).** Retrieved June 22, 2000 on the World Wide Web: http://www.statcan.ca/english/Pgdb/People/Education/educ03a.htm

Statistics Canada (2000d). **Population aged 15 and over with a disability, by nature of disability (Newfoundland, Prince Edward Island, Nova Scotia, New Brunswick – Census 1991).** Retrieved June 24, 2000 from the World Wide Web: http://www.statcan.ca/english/Pgdb/People/Health/health12a.htm

Statistics Canada (2000e). **Population aged 15 and over with a disability, by nature of disability (Québec, Ontario, Manitoba, Saskatchewan – Census 1991).** Retrieved June 24, 2000 from the World Wide Web: http://www.statcan.ca/english/Pgdb/People/Health/health12b.htm

Statistics Canada (2000f). **Population aged 15 and over with a disability, by nature of disability (Alberta, British Columbia, Yukon, Northwest Territories – Census 1991).** Retrieved June 24, 2000 from the World Wide Web: http://www.statcan.ca/english/Pgdb/People/Health/health12c.htm

Stoll, P.F. (1988). **Collaborative technology initiatives for serving persons with disabilities in NY state.** Unpublished manuscript. Albany, New York.

Stoloff, M. & Madison J. (1995). Teaching physiological psychology in a multimedia classroom. **Teaching of Psychology**, **22**(2), 138-141.

Swain, J., Finkelstein, V., French, S., & Oliver, M. (1993). **Disabling barriers enabling environments.** London: Sage Publications.

Todman, J., & Monaghan, E. (1994). Qualitative differences in computer experience, computer anxiety, and students' use of computers: A path model. **Computers in Human Behavior**, **10**(4), 529-539.

Torkzadeh, G. & Koufteros, X. (1994). Factorial validity of a computer self-efficacy scale and the impact of computer training. **Educational & Psychological Measurement**, **54**(3), 813-821.

Tousignant, J. (1995). **La vie étudiante des personnes handicapées dans les etablissements d'enseignement universitaire Québécois (un bilan des années 1989 a 1995).** Québec: Ministère de l'éducation: Direction générale des affaires universitaires et scientific.

Trace Research & Development Center. (undated). **Trace Center overview**. [Information Package]. Available Web site: http://trace.wisc.edu.

Trapp, A. & Hammond, N. (1994). Psychology: The use of educational technology in U.K. psychology. **Social Science Computer Review**, **12**(4), 589-609.

UCLA Graduate School of Education & Information Studies. (1999). **An overview of the 1998-99 faculty norms**. Retrieved August 30, 1999 on the World Wide Web: http://www.gseis.ucla.edu/heri/Faculty_Overview.html

University of Ottawa (1999, February 18). **Clientèle active (1997-98)**. Received on February 18, 1999 by fax from: (613) 562 5159.

Vallée, B. (1995). **Communication informatisée en éducation dans des communications informatisées et société**. M. Martin (Ed.), Télé-Université.

Vanderheiden, G.C., Chisholm, W.A., & Ewers, N. (1996). **Design of html pages to increase their accessibility to users with disabilities.** Available Web site: http://www.trace.wisc.edu/world/web/index.html.

Vargo, J. (1997, Summer). Getting serious about work. **Caliper**, 36.

Vingt ans après, assurer l'avenir des personnes handicapées. **Recherche Sociale, 6**(2), 3.

Visuaide (2000). Website: http://www.visuaide.com

Vitrine APO (Applications Pédagogiques de l'Ordinateur) (2000). Website: http://vitrine.ntic.org/vitrine

Waddell, C.D. (1999). **Understanding the digital economy: Data, tools, and research. The growing digital divide in access for people with disabilities: Overcoming barriers to participation**. Retrieved July 9, 1999 from the World Wide Web: http://www.aasa.dshs.wa.gov/access/waddell.htm.

Waddell, C. (2000). Providing services for post-secondary students: Legal issues. **CSUN 2000 Conference Proceedings**. Available April 10, 2000 on the World Wide Web: <http://www.csun.edu/cod/conf2000/proceedings/0123Waddell.html>.

Wallace, T. & Weatherman, D. (Eds). (1995). Distance Education. **Impact**, **8**(2).

Wasser, S. (1998, Winter). How well does McGill provide information technology to its students? **McGill University Computing Centre Newsletter**, 7-8. Also Retrieved August 22, 1999 on the World Wide Web: <http://www.mcgill.ca/cc/newsl/fall98/index.html>.

West, G. R. (1994, April). Teaching and learning adaptations in the use of interactive compressed video. **T.H.E. Journal** [On-line serial]. Available Web site: http://www.thejournal.com/past/April/44west.html.

Whitaker, G. W. (1995, Aug.). First-hand observations on tele-course teaching. **T.H.E. Journal** [On-line serial]. Available Web site: http://www.thejournal.com/past/aug/58whit.html.

Whiteneck, G. & Fougeyrollas P.(1996). Environmental factors task force position papers. **ICIDH Environmental Factors International Network**, **8**(3), 14-18.

Whitley, B.E. (1997). Gender differences in computer-related attitudes and behavior: A meta-analysis. **Computers in Human Behavior**, **13**(1), 1-22.

Wilkinson, K. (1996, June). **Increasing post-secondary access for students with disabilities through adaptive technology. Report from Set BC.** Vancouver: Ministry of Education, Skills and Training, & Skills Now initiative.

Wislock, R.F. (1993, Fall). What are perceptual modalities and how do they contribute to learning? **New Directions for Adult and Continuing Education**, **59**, 5-13.

World Health Organization (1980). **International classification of impairments, disabilities, handicaps: A manual of classification relating to the consequences of disease**. Geneva, SW: World Health Organization.

Wolfe, G., & Stokley, L. (1998, July). **Where are they now? Post-school outcomes for college students with disabilities**. Paper presented at the AHEAD Conference, Las Vegas, Nevada.

Wolforth, J. (1995). The provision of support services for students with disabilities in Canadian universities: The example of McGill University. **Japanese Journal of Developmental Disabilities**, **27**, 20-28.

Wolforth, J., & Fichten, C.S. (1991). Services for students with disabilities / Services aux élèves handicapé(e)s. **Factuel**, **3**(2), 5.

Wolforth, J., Connolly, T., Mellway, D., Hubka D., & Killean, E. (1998, November). **Developing a national approach to the provision of accessible post-secondary education**. Presentation at the National Educational Association of Disabled Students (NEADS) Biannual Conference, Ottawa, Canada.

Workforce Investment Act Of 1998: Sec. 508. Electronic And Information Technology. (2000). (PL 105-220, 1998 HR 1385; PL 105-220, enacted on August 7, 1998, 112 Stat 936; codified as: Section 504 of the Rehabilitation Act, 29 U.S.C. § 794d). Available April 9, 2000 on the World Wide Web: http://www.usdoj.gov/crt/508/508law.html.

York University (1999) Evaluation by York U. Centre for Study of Computers in Education finds majority of students satisfied with internet courses; grades as good as in-class courses, higher than correspondence. **York University Media Releases.** Retrieved August 25, 1999 on the World Wide Web: http://www.yorku.ca/admin/comm/release/archive/070999.htm

ZDNet (2000, March 17). **America's 100 most wired colleges**. Y-Life. Retrieved on March 24, 2000 from the World Wide Web: http://www.zdnet.com/yil/content/college/

BEST COPY AVAILABLE

APPENDIX

Figure 2.01

Age of Respondents

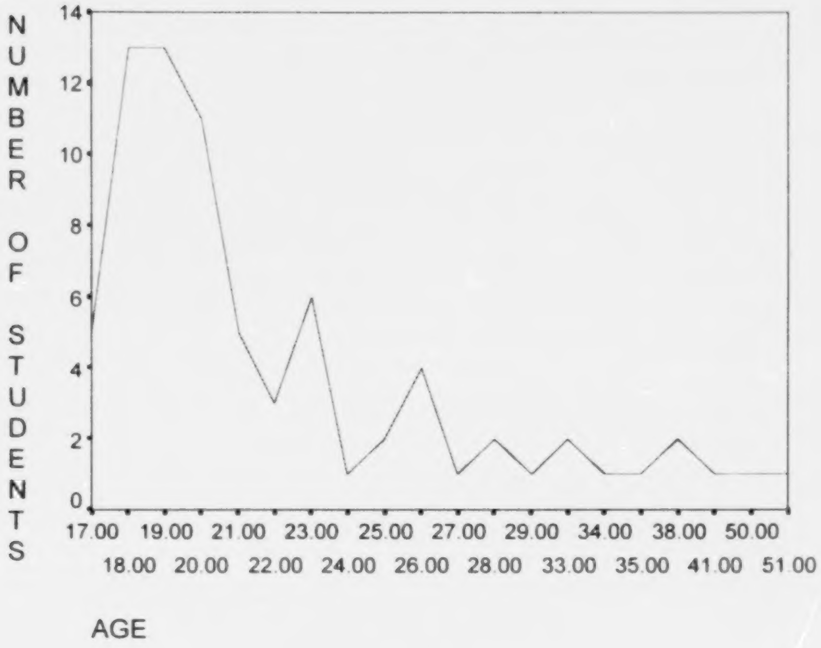

Figure 3.01

Percentage of Students with Disabilities in the Cegeps: AQEHPS Data

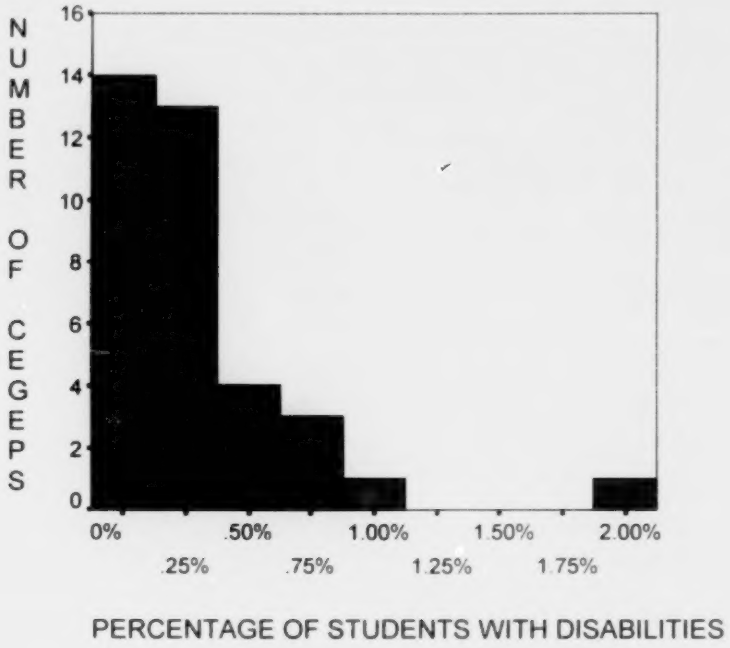

Figure 3 02

Percentage of Students with Disabilities in the Cegeps "Official" Data

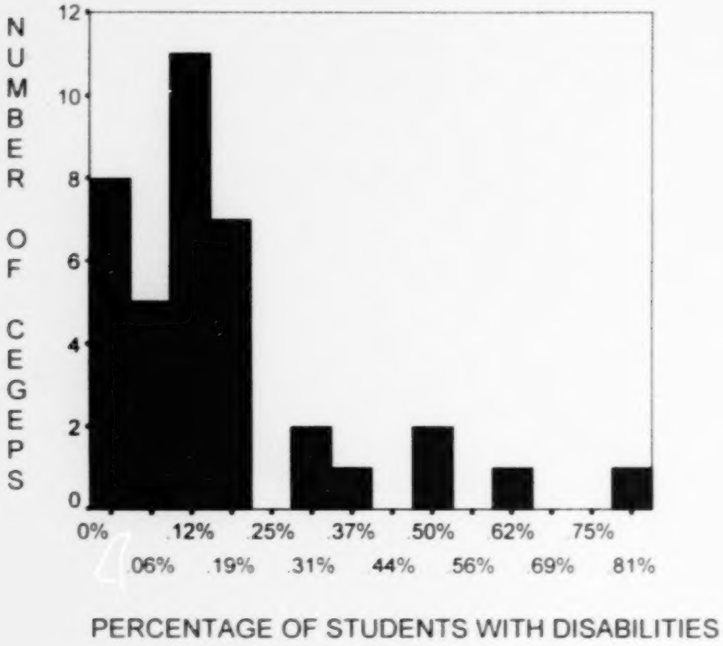

Figure 3.03

Percentage of Students with Disabilities in the Cegeps: Participants' Data

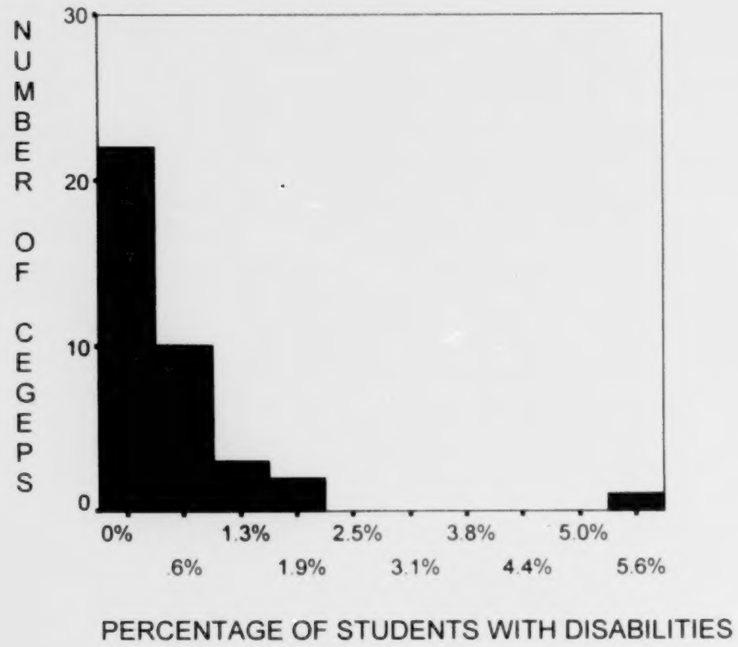

Table 0.01

Adaptech Research Team: Accomplishments Since 1996

Peer Reviewed Journal Articles

2000 Barile, M. (in press). Personal-political role of multiple minority status. **Disability Studies Quarterly**.

2000 Fichten, C.S., Barile, M., Asuncion, J.V., & Fossey, M. (in press). What government, agencies, and organizations can do to improve access to computers for postsecondary students with disabilities: Recommendations based on Canadian empirical data. **International Journal of Rehabilitation Research**.

1999 Barile, M. (1999). New reproductive technology: My personal and political dichotomy. In N. Amin, F. Beer, K. McPherson, A. Medovarski, A. Miles, and G. Rezai-Rashti (Eds.), **Canadian woman studies: An introductory reader** (pp. 433-435). Toronto: Inanna Publications and Education.

1998 Amsel, R. & Fichten, C.S. (1998). Recommendations for self-statement inventories: Use of valence, endpoints, frequency and relative frequency. **Cognitive Therapy and Research**, **22**, (3), 255-277. Retrieved October 29, 1999 on the World Wide Web: <http://www.catchword.com/cl=20/vl=25590594/nw=1/rpsv/catchword/plenum/01475916/v22n3/s5/p255>

1998 Barile, M. (1998). A minority in all seasons. In C. Nzula-Angelita, D. Ddielo, & G.Micaleff (Eds.), **Curaggia: Writing by women of Italian descent** (pp. 226-235). Toronto: Women's Press.

1997 Fichten, C.S., Amsel, R., Robillard, K., Sabourin, S., & Wright, J. (1997). Personality, attentional focus, and novelty effects: Attitudes toward peers with disabilities. **Rehabilitation Psychology**, **42**(3), 209-230.

1996 Barile M. (1996). Education and employment for the next millennium. **Women's Education des Femmes**, **12** (2), 42-45.

1996 Fichten, C.S., Lennox, H., Robillard, K., Wright, J., Sabourin, S., & Amsel, R. (1996). Attentional focus and attitudes toward peers with disabilities: Self focusing and a comparison of modeling and self-disclosure. **Journal of Applied Rehabilitation Counseling**, **27**(4), 30-39.

Peer Reviewed Proceedings And Eric Documents

1999 Fichten, C.S., Barile, M., & Asuncion, J.V. (1999). **Learning technologies: Students with disabilities in postsecondary education / Projet Adaptech : L'Utilisation des technologies d'apprentissage par les étudiant(e)s handicapé(e)s au niveau postsecondaire** (190 pages). ISBN 2-9803316-4-3. Final report to the Office of Learning Technologies, 1999, Spring. Ottawa: Human Resources Development Canada. Eric Document Reproduction Service (ED 433625 EC 37369). Abstracted and available September 7, 1999 on the World Wide Web in English:
<http://olt-bta.hrdc-drhc.gc.ca/publicat/Dawson79160exe.html>
and in French at: <http://olt-bta.hrdc-drhc.gc.ca/francais/publicat/Dawson79160exf.html>
and at: <http://www.cdc.qc.ca/Pages/rech.htm>
Full text version available in English September 7, 1999 on the World Wide Web:
<http://olt-bta.hrdc-drhc.gc.ca/download/Dawson79160.pdf>

1999 Fichten, C.S., Barile, M., & Asuncion, J.V. (1999, Spring). **Appendix to: Learning technologies: Students with disabilities in postsecondary education - Final report to the Office of Learning Technologies**. (107 pages). ISBN 2-9803316-5-1. Ottawa: Human Resources Development Canada. Eric Document Reproduction Service (ED 433625 EC 37369). Retrieved September 23, 1999 on the World Wide Web:
<http://www.omega.dawsoncollege.qc.ca/adaptech/olt99app.pdf>

1999 Fichten, C.S., Barile, M., Asuncion, J., Judd, D., Alapin, I., Reid, E., Lavers, J., Généreux, C., Guimont, J.P., & Schipper, F. (1999). **A comparison of postsecondary students with disabilities and service providers: Views about computer and information technologies**. Eric Document Reproduction Service (ED 432116). Published in Proceedings of the CSUN Conference, 1999, No. 0254, pages 1-5. Retrieved Jan 5, 1999 from the World Wide Web: <http://www.dinf.org/csun_99/session0254.html#top>

1998 Fichten, C.S., Barile, M., Asuncion, J., Judd, D., Lavers, J., Havel, A., Wolforth, J., Alapin, I., Maggiore, V., & Bailes, S. (1998). **Computer and information technologies: Student and service provider perspectives**. Eric Document Reproduction Service (ED 433626 EC 307370). Published on audiotape: (#T13): Visual Aids Electronics, 202 Perry Parkway, #5, Gaithersburg, MD 20877.

1998 Fichten, C.S. (1998). Role and impact of research in the colleges. **Proceedings / Actes du colloque de l'Association pour la recherche au collégial (ARC)**, **9**, 11-14.

1998 Fichten, C.S., Barile, M., Chambers, B., & Abrami, P. (1998). Computer and information technologies for postsecondary students with disabilities. **Proceedings / Actes du colloque de l'Association pour la recherche au collégial (ARC)**, **9**, 157-166.

1998 Fichten, C.S., Libman, E., Creti, L., Amsel, R., Tagalakis, V., & Brender, W. (1998). A Cognitive model of insomnia. **Proceedings / Actes du colloque de l'Association pour la recherche au collégial (ARC)**, **9**, 136-140.

Book Chapters And Booklets

1999 Robillard, C. (1999). **Étude exploratoire des facteurs de l'attirance sexuelle et de la dynamique de l'excitation sexuelle des femmes québécoises dans les couples interculturels comparativement aux couples québécois**. Master's thesis available at the Université du Québec à Montréal.

1998 Fichten, C.S. (1998). [Original article and title are in Japanese]. Support for students in universities. In Koyazu, T., Komatsu, R., and Tomiyasu, Y. (Eds.), **Lectures on humans and caring: Together with people with disabilities - The front line in education, employment, and medical treatment** (pp. 183-252). Tokyo: Keio University Press.

1996 Fichten, C.S., Goodrick, G., Amsel, R., & Libman, E. (1996). [Original article and title are in Japanese]. Students and their professors: A guide for the college student with a disability. In Y. Tomiyasu, R. Komatsu, and T. Koyazu (Eds.), **Support for university students with disabilities: A new feature of universities** (pp. 153-229). Tokyo: Keio University Press.

1996 Fichten, C.S., Goodrick, G., Amsel, R., & Libman, E. (1996). [Original article and title are in Japanese]. Teaching college students with disabilities: A guide for professors. In Y. Tomiyasu, R. Komatsu, and T. Koyazu (Eds.), **Support for university students with disabilities: A new feature of universities** (pp. 233-323). Tokyo: Keio University Press.

Articles In Magazines, Newsletters, And Web Sites

2000 Asuncion, J., Fichten, C.S., Barile, M., Fossey, M., Robillard, C., Généreux, C., & Wolforth, J. (in press). **Adaptech releases first Canadian study on computer use by students with disabilities in postsecondary education / Le Projet Adaptech publie la première recherche canadienne portant sur l'utilisation de l'informatique par les étudiants handicapés au niveau postsecondaire**. Communiqué.

2000 Barile, M. (2000). A chacun son modèle. **l'Enigme Journal**, **13**(4), 11.

2000 Barile, M., Fichten, C.S., Asuncion, J.V., & Alapin, I. (in press). A new high tech enterprise: The Adaptech Project / Une nouvelle initiative en technologie: Le Projet Adaptech. **l'Hermès - Bulletin de liaison de l'Association québécoise des étudiants handicapés au postsecondaire (AQEHPS)**.

2000 Barile, M. & Michèle, M. (2000). **Comment rendre le féminisme accessible a Montréal / How to render feminism accessible in Montreal**. Montréal: La Table de groupes des femmes de Montréal (TGFM).

1999 Asuncion, J.V., Barile, M., & Fichten, C.S. (1999). Role of rehabilitation agencies and professionals in providing computer and adaptive technologies to college and university students with disabilities. **Rehab Review**, **20**(3), 20-22.

1999 Barile, M. (1999). Enabling the environment. In J. Meister and S. Masuda (Eds.), **Dawning: How to start and maintain a group** (pp. 60-69). DAWN - Disabled Women's Network Canada, Vancouver, B.C.

1999 Barile, M. (1999). Mission statement. In The Working Group On Women's Health And New Genetics, National Network On Environment And Women's Health, Prairie Center On Excellence For Women's Health, and The Canadian Women's Heath Network (Eds.), **The women's health and new genetics community consultation: Briefing material**. Winnipeg, Manitoba: Authors.

1999 Fichten, C.S. (1999, May). Computers and students with disabilities in the Cegeps: Dawson's ITAC project. **Web Support Line**, No. **5**, 5-6. Retrieved April 20, 1999 from the World Wide Web: <http://www.dawsoncollege.qc.ca/text/WebSupport/index.htm#ITAC>

1999 Fichten, C.S., Asuncion, J., & Barile, M. (1999). Preliminary research findings and news from the Adaptech Project. **Cadsppeak (Newsletter of the Canadian Association of Disability Service Providers in Post Secondary Education)**, **1**(2), 4-5. **/ Résultats préliminaires de recherche et nouvelles du projet Adaptech. ACCSEHParler (Bulletin de l'Association Canadienne des Conseillers en Services aux Étudiants Handicapés au Postsecondaire)**, **1**(2), 4-5.

1999 Fichten, C.S., Barile, M., & Reid, E. (1999). Computer technologies and women with disabilities: Is there a common ground? **CAUT/ACPPU Bulletin Insert: Status of Women Supplement**, **46**(4), 5,10.

1999 Fichten, C.S., Lavers, J., Barile, M., Asuncion, J., Généreux, C., & Robillard, C. (1999, May). **Les technologies informatiques et d'apprentissage conventionnelles et adaptées**. Home page of La Vitrine APO (Applications Pédagogiques de l'Ordinateur) Available May 12, 1999 on the World Wide Web: <http://vitrine.ntic.org/vitrine/veille/textes/adaptes.html>.

1999 Fichten, C.S., Lavers, J., Barile, M., Asuncion, J., Généreux, C. & Robillard, C. (1999). Mainstream and "free" computer information and adaptive technologies revisited. **Alert: The Official Newsletter of the Association on Higher Education and Disability (AHEAD)**, **23**(2), 12-14. French translation: Les technologies informatiques et d'apprentissage conventionnelles et adaptées - Un retour (pp. 1-4) was included with the April 1999 (Vol. 23, No. 2) issue to the Canadian membership of AHEAD.

1998 Asuncion, J., Fichten, C.S., & Barile, M. (1998). The Adaptech research project: Where we've been and where we're going / Projet de recherche: maintenant et demain. **NEADS - Newsletter of the National Educational Association of Disabled Students / NEADS - Bulletin de l'Association nationale des étudiant(e)s handicapés au niveau postsecondaire**, **49**, 7-8. English version available Nov. 2, 1998 on the World Wide Web: <http://www.indie.ca/neads/aug98eng.html#sec8>

1998 Barile, M. (1998). Ferne Marshall: Barrier Buster / Ferne Marshall: La défonceuse des barrières. **Disabled Women in Action des Femmes Handicapées**, **4** (4), 8-11.

1998 Barile, M. (1998). Good news, bad new, no news, or just a fairy tale? / Bonnes nouvelles, mauvaises nouvelles - ou peut-être - un conte de fée? **Disabled Women in Action des Femmes Handicapées**, **4**(4), 5-7.

1998 Fichten, C.S. (1998). Of what use the Internet? / Internet à la portée de tous. **Factuel**, **10**(2), 22-23.

1998 Fichten, C.S. (1998). Students with physical disabilities. **EvNet Newsletter (Network for the Evaluation of Education and Training Technologies)**, **1**, Spring, p. 5. Retrieved November, 1999 on the World Wide Web: <http://socserv2.mcmaster.ca/srnet/news/v1toc.htm>

1998 Fichten, C.S., Asuncion, J., Barile, M., Judd, D., Alapin, I., Lavers, J., Généreux, C., Reid, E., Guimont, J.P. (1998). What computer and information technologies do postsecondary students with disabilities use? **The Able Informer** [On-line], **4**(8). Available at e-mail: <RosemaryMusachio@COMPUSERVE.COM>

1998 Fichten, C.S., Barile, M., Asuncion, J., Lavers, J., Alapin, I., Schipper, F., Généreux, C., & Judd, D. (1998). Mainstream and "free" computer information and adaptive technologies: News from the Dawson College Adaptech Research Project. **Alert: The Official Newsletter of the Association on Higher Education and Disability (AHEAD)**, **22**(2), 11-13. French translation: Les technologies d'apprentissage informatiques et adaptées "gratuites" et non-spécialisées: Nouvelles du projet de recherche Adaptech du Collège Dawson was included with the April 1998 issue of O'Canada - Newsletter of the Canadian Special Interest Group of the Association on Higher Education and Disability (AHEAD).

1996 Fichten, C.S. & Schipper, F. (1996). Preparing students with disabilities for the postsecondary experience. **Applying Research to the Classroom**, **14**(3), 7-11.

Tests And Audio-Visual Materials

1999 Fichten C.S., Asuncion, J., Judd, D., Barile, M., Alapin, I., Généreux, C., & Robillard, C. (1999). **EvNet Index to disabilities questionnaires - Adaptech Project computer and information technologies**. Retrieved May, 2000 on the World Wide Web:
<http://socserv2.mcmaster.ca/srnet/toolkit/questionnaires/tkdisability.htm>
Computer And Information Technologies Survey Of Postsecondary Students With Disabilities / Les Étudiants Handicapés De Niveau Postsecondaire Et Les Technologies D'apprentissage Informatiques – Une Enquête Du Projet Adaptech
English Regular Print Version: Available e-mail: <cficht@po-box.mcgill.ca >
English Large Print Version:
<http://socserv2.mcmaster.ca/srnet/toolkit/questionnaires/Fichten/Adlarge.doc>
and <http://socserv2.mcmaster.ca/srnet/toolkit/questionnaires/Fichten/Adlarge.pdf>
English Braille Version:
<http://socserv2.mcmaster.ca/srnet/toolkit/questionnaires/Fichten/Adbraill.htm>
and <http://socserv2.mcmaster.ca/srnet/toolkit/questionnaires/Fichten/Adbraill.txt>
and <http://socserv2.mcmaster.ca/srnet/toolkit/questionnaires/Fichten/Adbraill.pdf>
English Disk Version:
<http://socserv2.mcmaster.ca/srnet/toolkit/questionnaires/Fichten/Addisk.txt>
and <http://socserv2.mcmaster.ca/srnet/toolkit/questionnaires/Fichten/Addisk.pdf>
English Audio Tape Version:
<http://socserv2.mcmaster.ca/srnet/toolkit/questionnaires/Fichten/Adtape.doc>
and <http://socserv2.mcmaster.ca/srnet/toolkit/questionnaires/Fichten/Adtape.pdf>
French Regular Print Version, Disk Version, Large Print Version, Braille Version, and Audio Tape Version: Available e-mail: <cficht@po-box.mcgill.ca>

1999 Fichten, C.S., Asuncion, J., Judd, D., Barile, M., & Alapin, I. (1999). **Adaptech Project student and disability service provider structured interviews**. Retrieved May 2000 on the World Wide Web: <http://socserv2.mcmaster.ca/srnet/toolkit/questionnaires/Fichten/ph2qumet.doc>
and <http://socserv2.mcmaster.ca/srnet/toolkit/questionnaires/Fichten/ph2qumet.pdf>
English: Service Provider Interview Questions:
<http://socserv2.mcmaster.ca/srnet/toolkit/questionnaires/Fichten/ph2serqe.doc>
and <http://socserv2.mcmaster.ca/srnet/toolkit/questionnaires/Fichten/ph2serqe.pdf>
English: Student Interview Questions:
<http://socserv2.mcmaster.ca/srnet/toolkit/questionnaires/Fichten/ph2stuqe.doc>
and <http://socserv2.mcmaster.ca/srnet/toolkit/questionnaires/Fichten/ph2stuqe.pdf>
French: Questions D'entrevue Pour Les Répondant(e)s Locaux(les):
<http://socserv2.mcmaster.ca/srnet/toolkit/questionnaires/Fichten/ph2serqf.doc>
and <http://socserv2.mcmaster.ca/srnet/toolkit/questionnaires/Fichten/ph2serqf.pdf>
French: Questionnaire Pour Les Étudiant(e)s:
<http://socserv2.mcmaster.ca/srnet/toolkit/questionnaires/Fichten/ph2stuqf.doc>
and <http://socserv2.mcmaster.ca/srnet/toolkit/questionnaires/Fichten/ph2stuqf.pdf>

Submitted For Publication

2000 Asuncion, J, Fichten, C.S., Fossey, M.E., & Barile, M. (2000). **Dialoguing with developers and suppliers of adaptive computer technologies: Data and Recommendations**. Manuscript submitted for publication.

2000 Barile, M. (2000). **Imagine a world without women with disabilities - New reproductive and genetic technologies**. Manuscript submitted for publication.

2000 Fichten, C.S., Asuncion, J., Barile, M., Fossey, M., & De Simone, C. (2000). **Access to educational and instructional computer technologies for postsecondary students with disabilities: Lessons from three empirical studies. Manuscript submitted for publication**. Retrieved April 25, 2000 on the World Wide Web in html:
<http://evnet-nt1.mcmaster.ca/network/workingpapers/jemdis/jemdis.htm>
and in pdf: <http://evnet-nt1.mcmaster.ca/network/workingpapers/jemdis/jemdis.pdf>

2000 Fichten, C.S. , Asuncion, J. Barile, M., Généreux, C., Fossey, M., Judd, D., Robillard, C., De Simone, C., & Wells, D. (2000). **Technology integration for students with disabilities: Empirically based recommendations for faculty**. Manuscript submitted for publication. Retrieved May 14, 2000 on the World Wide Web:
<http://evnet-nt1.mcmaster.ca/network/workingpapers/Ere_Fichten/Ere_Fichten.htm>
and <http://evnet-nt1.mcmaster.ca/network/workingpapers/Ere_Fichten/Ere_Fichten.pdf>

2000 Fichten, C.S., Asuncion, J., Robillard, C., Fossey, M., Généreux, C., & Guimont, J.P. (2000). **What decision makers need to know about the needs of postsecondary students with disabilities.** Submitted for presentation.

2000 Fichten, C.S., Barile, M., Asuncion, J.V., & Fossey, M. (2000). What government and organizations which help postsecondary students obtain computer, information and adaptive technologies can do to improve learning and teaching: Recommendations based on empirical data. Submitted to M. Nagler (Ed.), **Perspectives on Disability (3rd ed.)** Available in html and pdf formats 19 April 2000 on the World Wide Web:
<http://evnet-nt1.mcmaster.ca/network/workingpapers/Adaptive/adaptive_recomend.htm>
and <http://evnet-nt1.mcmaster.ca/network/workingpapers/Adaptive/adaptive_tech.pdf>

Manuscripts In Preparation

2000 Fossey, M. et al. (2000). **Computer technologies and computer related financial aid: A guide for students with disabilities in postsecondary education**.

2000 Généreux, C. et al. (2000). **Six conditions pour l'accès aux nouvelles technologies de l'information et de communication (NTIC) pour les étudiants ayant des incapacités**.

Refereed Conference Presentations

2000 Asuncion, J. (2000, May). **National Educational Association of Disabled Students: Student Leadership and Advocacy the Canadian Way**. Presentation at the SUNY Empire State College DEED 2000 Conference - Building Common Ground and Disability Leadership for the New Millennium, Rochester, NY.

2000 Asuncion, J., Fichten, C.S., & Barile, M. (2000, May). **Distance education for all: Inclusion of learners with disabilities**. Presentation at the annual Conference of the Canadian Association for Distance Education (CADE), Québec, Québec. Abstracted in the Conference Program. Retrieved April 19, 2000 on the World Wide Web:
<http://www.ulaval.ca/aced2000cade/francais/resumes.htm>

BEST COPY AVAILABLE

2000 Barile, M. Fichten, C.S. Robillard, C., Fossey, M., Généreux, C., & Guimont, J.P. (2000, May). **Informatique et technologies adaptées dans les cégeps pour les étudiant(e)s ayant des limitations fonctionnelles (ITAC) : Résultats préliminaires / Computer And Adaptive Computer Technologies for Students With Disabilities In The Cegeps: Preliminary Results**. Presentation at the 12th Colloque de l'ARC, Hull, Québec. Abstracted in Propositions De Communication. Retrieved April 26, 2000 on the World Wide Web: <http://www.coll-outao.qc.ca/sdrp/ARC/ARC_PROP.htm>

2000 Fichten, C.S., Asuncion, J., Barile, M., Généreux, C., Judd, D., Alapin, I., Robillard, C., Fossey, M., & Guimont, J.P. (2000). **What do 800 students with disabilities say about their experiences with computers - Findings and recommendations from Canada's Adaptech Project**. Presented at AHEAD 2000, the Association on Higher Education And Disability (AHEAD) 23rd Annual Conference, Kansas City, Missouri.

2000 Fichten, C.S., Barile, M., Robillard, C., Fossey, M., Généreux, C., & Guimont, J.P. (2000). **Projet Adaptech: Collège Dawson - Informatique et technologies adaptées dans les cégeps**. In A. Cantin (Chair), Les TIC : qu'est-ce que ça change pour les sciences humaines? Panel presentation at the annual conference of the Association pour les applications pédagogiques de l'ordinateur au postsecondaire (APOP), Montréal, Québec.

2000 Fichten, C.S., Généreux, C., Barile, M., Asuncion, J., Fossey, M., Robillard, C., Judd, D., Lavers, J., & Guimont, J.P. (2000). **Computer and adaptive computer technologies in the postsecondary environment: An Adaptech Project update**. Presentation at the EvNet Conference, Cornwall, Ontario. Abstracted in EvNet Conference Abstracts (#18). Retrieved April 19, 2000 on the World Wide Web: <http://socserv2.mcmaster.ca/srnet/conf_spkrs.htm>

2000 Fossey, M., Fichten, C., Robillard, C., & Libman, E. (2000). **Accessibility of Computers for Students with Disabilities Scale (ACSDS): Postsecondary Institutions**. Presentation at the McGill Psychiatry Research Day Conference. Abstracted in Department of Psychiatry, McGill University, Ninth Annual Research Day Poster Presentations, Number 7.

2000 Robillard, C. (2000). **Le couple interculturel et son environnement familial et amical: une étude exploratoire**. Presentation at the 68e Congrès de l'Acfas, Montreal, Quebec.

1999 Fichten, C.S., Barile, M., Asuncion, J., Judd, D., Alapin, I., Reid, E., Lavers, J., Généreux, C., Guimont, J.P., & Schipper, F. (1999, March). **A comparison of postsecondary students with disabilities and service providers: Views about computer and information technologies**. Presentation at the annual conference of CSUN (California State University, Northridge) Technology and persons with disabilities - Where assistive technology meets the information age. Los Angeles.

1999 Fichten, C.S., Barile, M., Asuncion, J., Judd, D., Lavers, J., Havel, A., Wolforth, J., Alapin, I., & Reid, E. (1999). **Disability service providers' views and concerns about computer and information technologies**. Presentation at the annual convention of CADSPPE (Canadian Association of Disability Service Providers in Post-secondary Education), Victoria, BC.

1999 Schnackenberg, H., Asuncion, J., & Rosler, D. (1999, February). **The education forum: A web-based resource for teachers**. Presentation at the Association for Educational Communications and Technology (AECT), Houston, Texas.

1998 Asuncion, J. (1998). **Enabling technologies and students with disabilities in post-secondary education (Research in progress)**. Presentation at the Concordia University Education Students Symposium '98: Beyond the classroom - Education for a new millennium. Concordia University.

1998 Asuncion, J., Fichten, C.S., Barile, M., Alapin, I., & Lavers, J. (1998, April). **Computer, information and adaptive technologies in postsecondary education**. "Round-Robin" presentation at the 3rd ACM (Association for Computing Machinery) SIGCAPH (Computers and the Physically Handicapped) Conference on Assistive Technologies: ASSETS '98, Los Angeles.

1998 Asuncion, J., Lavers, J., Barile, M., Maggiore, V., Guimont, J.P., Schipper, F., & Fichten, C.S. (1998, Feb.). **Selected computer, information and adaptive technologies for students with disabilities: A demonstration**. Presentation at the EvNet Conference, Montréal, Québec. Abstract available at: <http://socserv2.mcmaster.ca/srnet/confabstracts/selected.htm>

1998 Barile, M., Asuncion, J., Lavers, J., Alapin, I., Maggiore, V., Guimont, J.P., Schipper, F., Chambers, B., & Abrami, P. (1998, Feb.). **Computer, information and adaptive technologies: Implications for students with disabilities in postsecondary education**. Presentation at the EvNet Conference, Montréal, Québec. Abstract available at: <http://socserv2.mcmaster.ca/srnet/confabstracts/disabilities.htm>

1998 Fichten, C.S., Généreux, C., Asuncion, J., Lavers, J., Guimont, J.P., Barile, M., & Alapin, I. (1998, June). **L'utilisation de technologies d'apprentissage informatiques et adaptées, gratuites et non spécialisées pour enseigner aux étudiants handicapés / Using mainstream and "free" computer, information and adaptive technologies to teach students with disabilities**. Presentation at the annual conference of the Association pour les applications pédagogiques de l'ordinateur au postsecondaire (APOP), Ste-Foy, Québec.

1997 Barile, M. & Fichten, C.S. (1997, May). **Computer and information technologies for postsecondary students with disabilities: Research in progress**. Presentation at the annual convention of the Association pour la recherche au collégial, Montréal, Québec. Abstracted in 9e colloque de l'ARC: Programme, 9. Retrieved 1998 from the World Wide Web URL: <http://www.cyberus.ca/~arc/programme.html>

1997 Fichten, C.S. (1997, July). **Postsecondary students with disabilities: Opportunities and abilities**. Presentation at the Second Japan Conference of the Association on Higher Education and Disability (AHEAD), Tokyo, Japan.

1996 Fichten, C.S. (1996, Aug.). **Nondisabled individuals' reactions toward people with disabilities**. In D. Dunn & T. Elliott (Co-Chairs), Advancing psychosocial theory in disability: The rehabilitation and social-personality psychology interface. Symposium at the American Psychological Association annual convention, Toronto. Abstracted in Rehabilitation Psychology, 1996, 41,(2), 166.

1996 Gething, L. & Fichten, C.S. (1996, Aug.). **Interaction with Disabled Persons Scale: A comparison between Canada and Australia**. Presentation at the XXVI International Congress of Psychology, Montréal. Abstracted in International Journal of Psychology, 1996, 31(3&4), 59. (#154.88).

Talks, Interviews, Presentations, And Invited Addresses

2000 Asuncion, J. (2000, May). **Student leadership panel**. Invited panel member at the SUNY Empire State College DEED 2000 Conference - Building Common Ground and Disability Leadership for the New Millennium, Rochester, NY.

2000 Asuncion, J. & Vida, S. (2000, April). **Preparing students with disabilities for the job market through equitable access to postsecondary education and technology**. Presentation at Wellsizing the Work Place, Toronto, Ontario.

2000 Bellini, M., Chandler, B., Généreux, C., Laliberté, A., Osgoode, K., Potvin, J., Taylor, C., & Wells, S. (2000). **SSHRC Review Panel meeting with EvNet partners**. Presentation at the SSHRC EvNet Site Visit, Cornwall, Ontario.

2000 Fichten, C.S., Asuncion, J., & Généreux, C. (2000, June). **Postsecondary students with disabilities and computer technologies**. Presentation at the SSHRC EvNet Site Visit, Cornwall, Ontario.

2000 Ganeva, I., Luconi, F., Luppicini, R., Kakkar, M., Therrien, M.C., Kalmin, A., Trim, K., Zweig, D., Vokey, S., Hachez, J., Asuncion, J., Wozney, L., O'Hara, E., Wade, A., McWhaw, K., Dru, J., Madore, M., & Tay, C. (2000, June). **SSHRC Review Panel meeting with research assistants and graduate students**. Presentation at the SSHRC EvNet Site Visit, Cornwall, Ontario.

1999 Asuncion, J. & Fichten, C.S. (1999, April). **Adaptech Project: Part I**. Interview on EASI Roundtable Webcast. Posted April 29 on the EASI web site <http://www.rit.edu/~easi>. Retrieved April 29, 1999 on the World Wide Web: <http://tlt-easi.com/realmedia/adaptech1.html>.

1999 Asuncion, J. & Fichten, C.S. (1999, May). **Adaptech Project: Part II**. Interview on EASI Roundtable Webcast. Posted May 6 on the EASI web site: <http://www.rit.edu/~easi>. Retrieved May 6, 1999 on the World Wide Web: <http://tlt-easi.com/realmedia/adaptech2.html>.

1999 Asuncion, J. & Vida, S. (1999, May). **Promoting accessible post-secondary education for students with disabilities**. Presentation at the 1st World Congress of Colleges and Polytechnics, Quebec, QC.

1999 Barile, M. (1999-2000). **Issues of persons with disabilities, with an emphasis on women with disabilities**. Guest lecture for the Social Service Program, Dawson College, Montréal.

1999 Fichten, C.S. (1999, Oct.). Invited presenter. **Séminaire de l'ARC: Research Seminar**. Dawson College, Montréal, Québec.

1999 Fichten, C.S. (1999, October). **Mainstream and "free" computer and adaptive technologies**. Presentation to members of Mission au Québec : Professeurs Britanniques - Central Bureau (Education Department) hosted by the Services for Students with Disabilities of Dawson College, Montréal, Québec.

1999 Fichten, C.S., Asuncion, J., Généreux, C., Barile, M., Fossey, M., Robillard, C., Lavers, J., Judd, D., Reid, E., Guimont, J.P., & Alapin, I. (1999, Oct.). **Postsecondary students with disabilities: Effective use of computer technologies in postsecondary education**. Presentation at the Research Fair of the Centre for the Study of Learning and Performance, Concordia University, Montreal, Quebec.

1999 Fichten, C.S., Barile, M. Asuncion, J., Judd, D., Généreux, C., Alapin, I., Fossey, M., Robillard, C., Lavers, J. & Guimont, J.P. (1999, Nov.). **Computer technologies in postsecondary education for students with disabilities / Technologies informatiques dans l'éducation postsecondaire des étudiants ayant des incapacités**. Presentation on behalf of the Office of Learning Technologies at the TeleLearning '99 Conference, Montréal, Québec. Retrieved Oct. 29, 1999 on the World Wide Web: <http://omega.dawsoncollege.qc.ca/cfichten/telepres/> (PowerPoint & text slide show); <http://omega.dawsoncollege.qc.ca/cfichten/telepres.pdf> (Adobe Acrobat); <http://omega.dawsoncollege.qc.ca/cfichten/telepres.htm> (HTML).

1999 Fichten, C.S. & Généreux, C. (1999, May). **Accommodating the needs of postsecondary students with disabilities: Teaching and research guidelines**. Presentation at the Fourth EvNet Conference, Sackville, New Brunswick.

1999 Fichten, C.S., Généreux, C., Barile, M., & Asuncion, J. (1999, May). **Findings about computing needs of postsecondary students with disabilities**. Presentation at the Fourth EvNet Conference, Sackville, New Brunswick.

1999 Fichten, C.S., Généreux, C., Barile, M., & Lavers, J. (1999, June). **Using computers effectively when teaching students with disabilities**. Presentation at the annual meeting of the Anglophone Service Providers for Students with Disabilities, Dawson College, Montréal, Québec. Retrieved June 9, 1999 on the World Wide Web: <http://socserv2.mcmaster.ca/srnet/adaptech/index.htm>

1999 Fichten, C.S., Généreux, C., Lavers, J., Fossey, M., & Asuncion, J. (1999, April). **Atelier informatique avec Adaptech / Computer workshop with Adaptech**. Invited presentation at the Assemblée générale annuelle de l'Association Québécoise des étudiants(es) handicapés(es) au post secondaire (AQEHPS).

1999 Schipper, F. (1999, Feb.). **Professionals and their clients with disabilities: Making a difference / A personal account: My life with CP**. Presentation at the 13th conference of OPSEP, McGill University, Montreal, QC.

1999 Schipper, F. (1999, Jan.). **Volunteering at Mackay Center**. Presentation at Trafalgar School, Montréal, QC.

1998 Asuncion, J. (1998, Nov.). Invited panel member. **National Educational Association of Disabled Students (NEADS) and Association québécoise des étudiants handicapés au postsecondaire (AQEHPS) Provincial Town Hall Meeting**. Montréal, Québec.

1998 Asuncion, J. & Rosler, D. (1998, February). The Teacher Forum: A web-based resource for teachers. Demonstration at the Concordia University Dept. of Education Student Symposium, Montreal.

1998 Barile, M., Judd, D., Millin, R., & Schipper, F. (1998). **Perspective of the client and the health care provider**. Panel members, Health Care and Professionalism-III, Physical and Occupational Therapy Programs, McGill University, Montreal, QC.

1998 Fichten, C.S., Alapin, I., Asuncion, J., Barile, M., Judd, D., & Lavers, J. (1998). Learning technologies and students with disabilities in postsecondary education. In Gill, J. (Ed.), **Current research into assistive technology for visually disabled persons**. London, England: Scientific Research Unit of the Royal National Institute for the Blind. Retrieved December 1998 from the World Wide Web: <http://www.dinf.org/tiresias/Currentresearch/cr1.htm>

1998 Fichten, C.S., Barile, M., Asuncion, J., Judd, D., Alapin, I., & Lavers, J. (1998, May). **Computers and students with disabilities in postsecondary education: Research in progress**. Presentation at the Research Fair of the Centre for the Study of Learning and Performance, Concordia University, Montreal, Quebec. Abstracted in Research Fair - Centre for the Study of Learning and Performance, p.9. Aug., 1998. Montréal: Concordia University.

1998 Généreux C. (1998, November). **Workshop panel member: Accessing funding to support post-secondary study**. National Educational Association of Disabled Students (NEADS) Biannual Conference, Ottawa, Canada.

1998 Généreux C. (1998, December). **Les étudiants ayant des incapacités: Un regard statistique**. Presidential address at the Colloque annuel de l'Association québécoise des étudiants handicapés au postsecondaire (AQEHPS), Montreal, Quebec.

1997 Asuncion, J. (1997, April). **Consideration of the inquiry into post-secondary education in Canada**. Witness at the hearings of the Subcommittee on Post-Secondary Education of the Standing Senate Committee on Social Affairs, Science and Technology, Ottawa. Proceedings retrieved May 26, 1999 on the World Wide Web: <www.parl.gc.ca/english/senate/com-e/educ-e/14ev-e.htm>

1997 Asuncion, J. (1997, June). **Blind and print disabled library users speak out about what works for them**. Invited panel member at the Preconference Session of the Canadian Library Association Convention - Making Connections, Ottawa.

1997 Barile, M. (1997). **Handicapism**. Guest lecture at WAVE, Montreal and at QPRIG, Concordia University, Montreal.

1997 Barile, M. (1997-1999). **Sexual assault and women with disabilities**. Bi-yearly guest lectures at the Sexual Assault Center, McGill University, Montréal.

1997 Barile, M. (1997-1999). **Feminism and disability: A standpoint perspective**. Presentation at the Women's Studies Programme, McGill University, Montréal, QC.

1997 Fichten, C.S. (1997, May). **Témoignage sur la recherche au collégial et ses impacts**. Invited keynote presentation at the annual convention of the Association pour la recherche au collégial, Montréal, Québec.

1997 Fichten, C.S. (1997, Feb.). **Disabilities**. Invited presentation at the 2nd EvNet Workshop, Hamilton, Ontario.

1997 Fichten, C.S., Amsel, R., Robillard, K., Tagalakis, V., Wright, J., Sabourin, S., & Libman, E. (1997). **Integration of people with physical and sensory impairments / Intégration sociale des personnes handicapées physiquement et sensoriellement**. The Sir Mortimer B. Davis Jewish General Hospital - Lady Davis Institute for Medical Research: Scientific report 1994-1995 (pp. 172-175) / Hôpital Générale Juif - Sir Mortimer B. Davis - Institut Lady Davis de Recherches Médicales: Rapport scientifique 1996-97 (pp. 183-186). Montréal.

1997 Maggiore, V., Fichten, C.S., & Lavers, J. (1997, Oct.). **Teaching and learning via the Internet: The virtual college classroom**. Presentation at the Dawson College Open House, Montréal, QC.

Theses And Student Projects Supervised

1999 Lanoue, N.A. (under the supervision of C.S. Fichten) (1999). **Learning technologies and students with disabilities in post secondary education: Role of age, sex, and prior experience**. Undergraduate thesis, Concordia University.

1999 Leblanc, A. (under the supervision of C.S. Fichten and D. Massé) (1999). **The socio-economic development of college students with physical disabilities - a case study**. M.Ed. thesis, Faculty of Education, Université de Sherbrooke.

Awards And Grants

Office of Learning Technologies Computer and information technologies: Supports for the postsecondary education of students with disabilities - A companion to the study of learning technologies and students with disabilities in postsecondary education (awarded to C.S. Fichten & M. Barile)	1999-01
Dawson College. Adaptation to Technological and Programme Changes Educational computing and network for the evaluation of educational technology (awarded to C. Fichten)	1997-01
Social Sciences and Humanities Research Council (SSHRC) Strategic Research Networks Network for the Evaluation of Education & Training Technologies (EvNet) [awarded to C. Cuneo (Network Leader) and Abrami, P. C., Conrath, D.W., Campbell, B., C.S. Fichten, LaFranco, S., Harnish, D., Holt, P., Procter, M., Schmid, R., Webster, J., & Wright, R.]	1996-01
Human Resources Development Canada Challenge 2000 Grant (Summer Career Placements (SCP) Program) (awarded to C.S. Fichten)	2000
Fonds pour la formation de chercheurs et l'aide à la recherche (FCAR) Programme Équipement du Fonds FCAR NTIC Learning Laboratory (awarded to Abrami, P., Chambers, B., d'Apollonia, S, Fichten, C.S., & Schmid, R.)	1999-00
FRSQ Réseau de recherche en santé mentale - Axe: Troubles du sommeil Demographic characteristics of sleep quality in patients with chronic schizophrenia (awarded to Boivin, D., Fichten, C.S. & Libman, E.)	1999-00
Programme d'aide à la recherche sur l'enseignement et l'apprentissage (PAREA) Access to college for all / L'accessibilité au cégep pour tous (awarded to C.S. Fichten & M. Barile)	1998-00
Office des personnes handicapées du Québec Volet CIT - Integration au Travail (awarded to C.S. Fichten)	1996-00
Human Resources Development Canada Challenge '99 Grant (awarded to C.S. Fichten)	1999
Social Sciences and Humanities Research Council (SSHRC) Challenges and Opportunities of a Knowledge-based Economy People with disabilities in the knowledge-based economy (awarded to C.S. Fichten, P. Abrami, R. Amsel, M. Barile, & J. Wolforth)	1999
Office of Learning Technologies Learning Technologies & Students with Disabilities in Postsecondary Education (awarded to C.S. Fichten and M. Barile)	1997-99
Human Resources Development Canada Challenge '98 Grant (awarded to C.S. Fichten)	1998
Direction générale de l'enseignement collégial (DGEC) Programme d'aide pour les applications pédagogiques des NTIC Uniformity and diversity in the classroom: The role of the new technologies on information and communication (awarded to S. d'Apollonia, R. Bourgeois, H. Elizov, C.S. Fichten, B. Geslain, J. Guerriero, J.P. Guimont, J. McGill, Z. Szigetvari, & H. Wehden)	1997-98

Conseil Québécois de la recherche sociale (CQRS) 1997-98
Women with disabilities: Access to health care
(awarded to M. Barile & C.S. Fichten)

Appointments / Recognition

2000	Asuncion, J. (2000). **National Federation of the Blind: Advocates for Equality Scholarship**, Toronto.
2000	Asuncion, J. (2000). **Council of Canadians with Disabilities (CCD): National Award for Outstanding Contribution to the work of the National Educational Association of Disabled Students (NEADS)**.
2000	Barile, M. (2000). **Appointed accessibility consultant**. La table de concertation.
2000	Barile, M. (2000). **Appointed to the Board of Directors** of Actions des femmes handicapées.
2000	Fichten, C.S. (2000). **Promoted to Associate Professor**, Department of Psychiatry, McGill University.
2000	Fichten, C.S. (2000). **Chair**: Session on disabilities, education, & computer technologies at the annual conference of the Network for the Evaluation of Education and Training Technologies (EvNet)
2000	Fichten, C.S. (2000). **Chair**: Session on web course design and evaluation at the annual conference of the Network for the Evaluation of Education and Training Technologies (EvNet)
2000	Fossey, M.E. (2000). **French Language Website Consultant**. National Educational Association of Students with Disabilities.
2000	Généreux, C. (2000). **Hommage bénévolat-Québec 2000 Prize for Outstanding Contribution to the Social Well-being of Quebeckers**, Government of Quebec.
2000	Judd, D. (2000). **Participant in a commercial for the Montreal Association for the Blind**, Montreal, QC.
2000	Robillard, C. (2000). **Master's Degree**. Awarded by Université du Québec à Montréal.
1999	Asuncion, J. (1999-2000). **Concordia University, Dept. of Education Educational Technology Student Representative**, Montréal.
1999	Asuncion, J. (1999-2000). **Member of the Organizing Committee of Concordia University Dept. of Education Student Symposium 2000**, Montréal.
1999	Asuncion, J. (1999). **Year 2000 Conference Chair, National Educational Association of Disabled Students NEADS)**, Ottawa.
1999	Asuncion, J. (1999). **Web Site Manager, National Educational Association of Disabled Students NEADS)**, Ottawa.
1999	Asuncion, J. (1999). **Council of Canadians with Disabilities (CCD): National Award for Outstanding Contribution to the work of the National Educational Association of Disabled Students (NEADS)**.
1999	Barile, M. (1999-2001). **Consultant: Canadian Centre on Disability Studies**. Project title: Assessments tool and handbook on best practices: When people with disabilities apply technologies to paid work.
1999	Barile, M. (1999-2000). **Montreal Independent Living Resource Centre (ILRC) Feasibility Study Steering Committee member**.
1999	Barile, M. (1999). **Appointment to the newsletter committee**. Action des Femmes Handicapées (AFHM).
1999	Barile, M. (1999). **Appointment to the newsletter committee**. Canadian Women's Health Network (CWHN).
1999	Barile, M. (1999). **Appointment to the Steering Committee to start an Independent Living Resource Center (ILRC)**. Montreal, Quebec.
1999	Barile, M. (1999). **Selected to co-author a resource manual and policy on how to integrate women with disabilities and their issues**. Table Groupe de Femmes Montreal (TGFM).
1999	Fichten, C.S. (1999-present). **Appointed to the Board of Directors of the Association québécoise des étudiants ayant des incapacités au postsecondaire (AQEIPS)**.

BEST COPY AVAILABLE

1999	Schipper, F. (1999 - present). **Appointed Volunteer Coordinator for Mobility Cup 2000** (international adapted sailing regatta)
1998	Asuncion, J. (1998). **Organizing Committee Member**. National Educational Association of Disabled Students (NEADS) Biannual Conference. Ottawa, Canada.
1998	Asuncion, J. (1998). **Member of the 1998 Concordia University Department of Education Student Symposium Organizing Committee**. Concordia University, Montreal.
1998	Asuncion, J. (1998). **Co-host: Opening plenary**. National Educational Association of Disabled Students (NEADS) Biannual Conference. Ottawa, Canada.
1998	Asuncion, J. (1998). **Co-moderator of session: Developing a national approach to the provision of accessible post-secondary education**. National Educational Association of Disabled Students (NEADS) Biannual Conference. Ottawa, Canada.
1998	Fichten, C.S. (1998-1999). **Member of the 1999 Association for Advancement of Behavior Therapy (AABT) Conference Program Committee**.
1998	Fichten, C.S. (1998-1999). **Associate Editor of the Canadian Journal of Rehabilitation**.
1998	Généreux, C. (1998-1999). **Président de l'Association québécoise des étudiants ayant des incapacités au postsecondaire (AQEIPS)**. Montréal, Québec.
1998	Généreux, C. (1998-1999). **Vice-président du conseil d'administration de l'Association des étudiants handicapés de l'UQAM (ADEHUQAM)**.
1998	Guimont, J-P. (1998). **Appointed Contributing Editor: Web Support Line**: A publication to inform the Dawson Community about the potential of the Internet and the World Wide Web. <http://www.dawsoncollege.qc.ca/text/WebSupport/index.htm>.
1998	Robillard, C. (1998). **Delegate: Comité des affaires sociales, et culturelles de Singapour: Une simulation des Nations Unies (McMUN 1998)**, Université du Québec à Montréal.
1998	Robillard, C. (1998). **Assistant with the swimming competition for participants with disabilities: Défi sportif 1998**. Montréal, Québec.
1997	Asuncion, J. (1997). **Lions Club Scholarship For Disabled Students**, Montreal.
1997	Asuncion, J. (1997). **Canadian delegate to the 1997 Summer Young Adult Leadership and Disability Rights Exchange Program, Mobility International USA**. Eugene, OR.
1997	Fichten, C.S. (1997-1998). **Member of the Shriners Hospital for Children Sexuality Committee**.
1997	Fichten, C.S. (1997). Témoignage sur la recherche au collégial et ses impacts. **Invited keynote presentation at the annual convention of the Association pour la recherche au collégial**, Montréal, Québec.
1997	Fichten, C.S. (1997). **Prix de l'A.R.C. pour Contribution au Développement de Carrières Scientifiques**. Prize jointly awarded by A.R.C., Faculté des Sciences de l'Education de l'Université de Montréal, and the CEQ for extraordinary contribution to the scientific careers of students and young researchers.
1997	Fichten, C.S. (1997). **Member of Awards Jury: Association on Higher Education and Disability (AHEAD)** Meeting the Challenge Award (innovative application of adaptive/assistive technology).
1997	Fichten, C.S. (1997). **External examiner for a doctoral thesis at the Université de Montréal**.
1997	Fichten, C.S. (1997). **Keynote speaker: Second Japan Conference of the Association on Higher Education and Disability (AHEAD)**, Tokyo, Japan.
1997	Généreux, C. (1997-1999). **Membre du conseil d'administration: Nous nous intégrons en commun (le NIC)**.
1997	Schipper, F. (1997-1998). **Member of the Shriners Hospital for Children Sexuality Committee**.
1997	Schipper, F. (1997). **Certified "Administrator of Volunteer Resources - CAVR" by the Canadian Administration of Volunteer Resources**.
1996	Asuncion, J. (1996-2000). **Vice-President Internal & "Open Representative" on the Board of Directors: National Educational Association of Disabled Students (NEADS)**. Ottawa.
1996	Asuncion, J. (1996). **Quebec Federation of the Blind Bursary**, Montreal.
1996	Fichten, C.S. (1996-2000). **Member of the 1999 American Psychological Association, Division 22 Conference Program Committee**.

1996 Fichten, C.S. (1996-1998). **Guest reviewer for scholarly journals**. Canadian Journal of Rehabilitation, Journal of Behavioral Medicine, Journal of Clinical Child Psychology, Journal of Consulting and Clinical Psychology, Journal of Psychosomatic Research, Journal of Postsecondary Education and Disability, Journal of Social and Clinical Psychology, Psychology and Aging.

1996 Fichten, C.S. (1996-1998). **Reviewer of grants as an external expert: Fonds pour la formation de chercheurs et l'aide à la recherche (FCAR)**, Fonds de la recherche en santé du Québec (FRSQ)

1996 Fichten, C.S. (1996-1997). **Conference Program Committee: Association pour la recherche au collégial (ARC) '97 annual convention**.

1996 Généreux, C. (1996-1998). **Vice-président de l'Association québécoise des étudiants handicapés au postsecondaire (AQEHPS)**, Montréal, Québec.

1996 Robillard, C. (1996 - present). **Collaborator on the answering committee of the sexology web site "Elysa."** Université du Québec à Montréal.

1996 Schipper, F. (1996-present). **Vice Chair of the adapted sailing association: Association québécoise de voile adaptée (AQVA)**. Montréal, Québec.

Adaptech In The News

2000 Geslain, B. (2000). Compte rendu du séminaire tenu le 29 octobre, 1999 au collège Dawson. **ARC: Le Bulletin**, **13**(2), 5-6.

2000 Lougheed, Tim. (2000). New perspectives on accessible technology. **University Affairs, June/July**, **2000**, **22**, 26-27. Retrieved June 15, 2000 on the World Wide Web: <http://www.aucc.ca/en/university_affairs/feature/2000/june-july/technol.pdf>

2000 Lougheed, Tim. (2000). Nouvelles perspectives sur la convivialité des techniques. **Affaires universitaires**, **Juin/Juillet 2000**, 24-27.

2000 Staff Writers. (2000). Adaptech Project. **The CanLearn Insider**. Retrieved March 16, 2000 on the World Wide Web: <http://www.canlearn.ca/English/cafe/insider/issue_1/resources.shtml>

2000 Staff writers. (2000). **New publications / Nouvelles publications, LT Highlights / TA en vedette. January/February #6**. Retrieved February 18, 2000 on the World Wide Web in English:
<http://olt-bta.hrdc-drhc.gc.ca/pract/nletter/index.html>
and in French: <http://olt-bta.hrdc-drhc.gc.ca/francais/pract/nletter/index.html>

1999 Faba, N. (1999). Adaptech examines technology in post-secondary study / ADAPTECH mène une étude sur l'utilisation des technologies en milieu postsecondaire. (1999). **Bulletin NEADS Newsletter**, No. **51**, Fall, 1-2.

1999 Staff writers. (1999). Welcome to our new research projects / Bienvenue à nos nouveaux projets de recherche. **EvNet News / Nouvelles EvNet**, **3**(Fall), 14.

1999 Staff Writers (1999). Publications of note: "Learning Technologies: Students With Disabilities In Postsecondary Education." **The NODE: Networking**, **3**(13) 15 September 1999. Retrieved September 19, 1999 on the World Wide Web: <http://node.on.ca/networking/september1999/publications.html>

1998 **National Educational Association of Disabled Students (NEADS) (1998). Year end report 1997/98 / Rapport de fin d'année**. Ottawa: NEADS at Carleton University.

1998 Staff Writers (1998). Adaptech research project goes online. **The NODE: Networking**, **2**(9), May 6. Retrieved in 1999 from the World Wide Web: <http://node.on.ca/networking/may1998/briefs2.html#Adaptech>

1998 Staff Writers. (1998). June 10, 11, and 12. **Dawson College Web Support Line**, **1**(1), 2.

1998 Staff Writers. (1998). Health: Summary from Health Committee / Santé: Sommaire des activités du Comité. **Newsletter of AFHQ (Action des Femmes Handicapées du Montréal**, **4**(1), 1-6.

1998 Sunerton, B. (1998). Researcher extraordinaire: Catherine Fichten. **Ensemble**, **7**(1), 32-33.

1997 Demers, P. (1997). College research in search of itself. **Factuel**, **9**(3), 18.

1997 Raiche, G. (1997). Nouvelles du 9e colloque de l'A.R.C. **Le Bulletin de l'A.R.C.**, **10**(2), 10.

BEST COPY AVAILABLE

Table 1.01

Student Focus Group Questions: English	Student Focus Group Questions: French
1. Do you use a computer?	1. Utilisez-vous un ordinateur?
If yes, what kind is it? Do you use any adaptations for your computer or have you made any modifications to it to make it better meet your needs?	**Si oui** de quel type? Utilisez-vous certaines adaptations ou avez-vous fait des modifications à votre ordinateur qui lui permettrait de mieux répondre à vos [illegible]
If no, why not? Does it cause problems for you that you do not use a computer? Do you foresee using a computer in the near future?	**Si non,** pourquoi pas? Ne pas utiliser d'ordinateur vous cause-t-il des problèmes? Prévoyez-vous utiliser un ordinateur dans un proche avenir ?
2. **If you use a computer**, how did you learn to use it? Did this work well for you? Is there some other way of learning that would have been helpful?	2. **Si vous utilisez un ordinateur**, comment avez-vous appris à l'utiliser? Comment cela a-t-il fonctionné pour vous? Y aurait-il une autre façon d'apprendre qui vous aurait été utile?
If you don't use a computer, was learning to use it an issue for you? How so?	**Si vous n'utilisez pas un ordinateur**, est-ce que l'apprentissage de son fonctionnement était une préoccupation pour vous? Comment?
3. **If you use a computer at home**, how did you acquire it? Did you use a subsidy program to obtain your equipment? (If yes, what program(s), how well did the program work for you, what do you think about the program?) If you did not use a subsidy program, why not?	3. **Si vous utilisez un ordinateur à la maison**, comment l'avez-vous obtenu? Avez-vous eu recours à un programme de subventions? (Si oui, quel(s) programme(s), comment cela a-t-il fonctionné pour vous, que pensez-vous de ce programme?) Si vous n'avez pas eu recours à un programme de subventions, pourquoi pas?
If you don't use a computer at home, were you aware of subsidy programs that are available to you? If yes, why did you not use this?	**Si vous n'utilisez pas un ordinateur à la maison**, étiez-vous au courant de la disponibilité de programmes de subventions pour vous? Si oui, pourquoi vous n'y avez pas eu recours?
4. Do you use a computer at school?	4. Utilisez-vous un ordinateur à l'école?
If yes, where do you use it? How well does this work for you?	**Si oui**, où l'utilisez-vous?
If no, why not? Does it cause problems for you that you do not use a computer at school?	**Si non**, pourquoi pas? Comment cela fonctionne-t-il pour vous? Ne pas utiliser d'ordinateur à l'école vous cause-t-il des problèmes?
5. What works really well for you and what kinds of problems have you had with computer technologies? What are some possible solutions to the problems that you mentioned?	5. Qu'est-ce qui fonctionne bien pour vous et quels problèmes avez-vous rencontrés au sujet des technologies informatiques? Quelles solutions envisagez-vous face aux problèmes mentionnés?
6. What other issues concern you in this area?	6. Quels autres sujets vous concernent dans ce domaine?

Table 1.02

Service Provider Focus Group Questions: English	Service Provider Focus Group Questions: French
1. At your cegep, how are computer technologies for students with disabilities organised (e.g., what kinds of equipment do you have, where is it located, who looks after it, who shows students how to use it, who repairs it when broken, is there a loan program, what is the role of other departments such as the library audio-visual and computer services in providing computer services to students with disabilities)?	1. Dans votre cégep, comment les technologies informatiques pour les étudiants ayant des limitations fonctionnelles sont-elles organisées? (Par exemple, quel genre d'équipement avez-vous, où est-il situé, qui en prend soin, qui montre aux étudiants comment l'utiliser, qui le répare, y a-t-il un programme de prêts, quel rôle les autres services tels le service audiovisuel, de la bibliothèque et le service informatique jouent dans l'offre de services informatiques aux étudiants ayant des limitations fonctionnelles?)
2. If it is you who assists students in using computer technologies, how did you learn to use the technologies? Did this work well for you? Is there some other way of learning that would have been helpful?	2. **Est-ce que vous assistez les étudiants utilisant des technologies informatiques?** Comment ont-ils appris à utiliser les technologies? Comment cela a-t-il fonctionné pour eux? Y aurait-il une autre façon d'apprendre qui leur aurait été utile?
If you don't assist students in using computer technologies, who does? How did they learn to use the technologies? Did this work well for them? Is there some other way of learning that would have been helpful?	**Si vous n'assistez pas les étudiants utilisant des technologies informatiques**, qui le fait? Comment cela a-t-il fonctionné pour eux? Y aurait-il une autre façon d'apprendre qui leur aurait été utile?
3. How did your cegep acquire computer technologies for your students? How well does this system work for you and your students? What are its good and bad points?	3. Comment votre cégep a-t-il obtenu les technologies pour vos étudiants? Jusqu'à quel point ce système fonctionne bien pour vous et vos étudiants? Mesurez le pour et le contre?
4. Are subsidy programs available to assist students with disabilities to buy or loan computer equipment? If yes, which programs? How do you feel about the subsidy programs that are available to students - what are their good and bad points?	4. Y a-t-il des programmes de subvention disponibles pour aider les étudiants à acheter ou à louer les équipements matériels? Si oui, lesquels? Que ressentez-vous face aux programmes de subvention disponibles pour les étudiants – mesurez le pour et le contre?
5. What would you like to see happen in this area?	5. Quel développement aimeriez-vous voir dans ce domaine?
6. What works really well in the area of computer and information technologies and what do you see as the key problems for you and for students with disabilities at your cegep? What are some possible solutions to the problems that you mentioned?	6. Qu'est-ce qui fonctionne bien dans le domaine des technologies informatiques et des technologies d'information et où voyez-vous les problèmes majeurs pour vous et les étudiants ayant des limitations fonctionnelles dans votre cégep? Quelles solutions envisageriez-vous face aux problèmes mentionnés?

Table 1.03

Professor Focus Group Questions: English	**Professor Focus Group Questions: French**
1. Do you have a computer or internet component included in any of your courses?	1. Utilisez-vous des ordinateurs ou des technologies d'information dans vos cours?
If yes, please describe [e.g., What software/hardware do you use? Where and how do you use these (i.e., homework assignment, in-class activities)? Do you use the internet? If so, for what purpose?].	**Si oui**, s'il vous plaît décrivez la situation. Par exemple quel logiciel (*software*) ou équipement matériel (*hardware*) utilisez-vous? Où et comment en faites-vous usage (c.-à-d. pour faire des devoirs à la maison, lors d'activités en classe)? Utilisez-vous l'Internet? Si tel est le cas, quel usage en faites-vous?
If no, do you foresee this in the near future? If so, what do you see yourself using?	**Sinon**, prévoyez-vous l'utiliser dans un proche futur? Si tel est le cas, lesquelles croyez-vous utiliser vous-même?
2. Have you had any experience teaching students with disabilities who have used computer or information technologies in taking your courses?	2. Avez-vous eu l'occasion d'enseigner à des étudiants ayant des limitations fonctionnelles qui utilisaient des ordinateurs ou des technologies d'information dans le contexte de vos cours?
If yes, what software or hardware did you or they use and how well did this work?	**Si oui,** quel logiciel (*software*) ou équipement matériel (*hardware*) utilisiez-vous, où les étudiants les utilisaient-ils et comment cela a-t-il fonctionné?
If no, have you taught students with disabilities who could have benefited form using computer or information technologies in taking your course? How so?	**Sinon**, avez-vous enseigné à des étudiants avec des limitations fonctionnelles qui auraient pu bénéficier d'ordinateurs ou de technologies d'information dans le contexte de vos cours? Comment?
3. What do you see happening concerning the use of computer and information technologies in teaching at your cegep in the next 5 years? Do you foresee problems with these technologies in teaching students with disabilities?	3. Que croyez-vous arrivera dans les cinq prochaines années en ce qui concerne les ordinateurs et les technologies d'information dans l'enseignement dans votre cégep? Prévoyez-vous des problèmes au sujet de ces technologies et de l'enseignement aux étudiants ayant des limitations fonctionnelles?
4. Does your cegep provide you with resources and/or expertise to help you use computer and information technologies in teaching students with disabilities more effectively? If yes, please describe this. If no, please indicate whether this would be useful and if so, what could be done to accomplish this.	4. Votre cégep vous offre-t-il les ressources ou l'expertise qui vous aiderait à utiliser plus efficacement les ordinateurs ou les technologies d'information dans l'enseignement aux étudiants ayant des limitations fonctionnelles? Si oui, s'il vous plaît, décrivez la situation. Sinon, indiquez si cela serait utile et que faudrait-il pour rendre cette situation possible.
5. What works really well in the use of computer and information technologies at your cegep and what do you see as the key problems for you and your students, both with and without disabilities? What are some possible solutions to the problems that you mentioned?	5. Qu'est-ce qui fonctionne bien dans le domaine des technologies informatiques et technologies d'information et où voyez-vous les problèmes majeurs pour vous et les étudiants ayant et n'ayant pas des limitations fonctionnelles dans votre cégep? Quelles solutions envisageriez-vous face aux problèmes mentionnés?
6. What other issues concern you in this area?	6. Quels autres sujets vous concernent dans ce domaine?

Table 2.01

Demographics: Numbers Of Students

Variable	Whole Sample #	Whole Sample %	#	#	Pursuing College Diploma	Student During Past 2 Years But Not Currently	Taking Courses
			Anglophone	Francophone			
Total Number Of Participants	76		21	55	69	3	4
Females	40	53%	10	30	37	1	2
Males	36	47%	11	25	32	2	2
Language Reported Spoken More Often[1]	76		Females	Males			
Anglophone	21	28%	10	11	16	3	1
Francophone	55	72%	30	25	52	0	3
Age			Females	Males	Anglophone	Francophone	
Mean	22.87		20.78	25.19	22.85	22.87	
Standard Deviation	7.05		3.50	9.08	4.63	7.05	
Range	17-51		17-34	17-51	18-35	17-51	
Duration Of Impairment[2]							
Since Childhood (Age <10)	56	77%					
In Between	15	21%					
Acquired Recently (Past 5 Years)	2	3%					
Field Of Study (includes both pre-university and careers programs)			Females	Males	Anglophone	Francophone	
Arts	57	75%	32	25	16	41	
Social Science	49	64%	30	19	9	40	
Fine Arts	7	9%	2	5	7	0	
Unclassifiable Arts	1	1%	0	1	0	1	
Science And Technology	18	24%	8	10	5	13	
Pure Science	9	12%	5	4	3	6	
Technology/Computers/Engineering	9	12%	3	6	2	7	
Other	1	1%	0	1	0	1	

[1] Two Francophone students indicated attending English cegeps.

[2] Only 73 participants responded to this question.

Table 2.02

Questionnaires Sent and Received

	Sent[1]	Received	
College	Number of Questionnaires	Number of Students	Percent of Sample
French - Public Colleges			
Cégep 1	12	2	2.63%
Cégep 2	2		
Cégep 3	8		
Cégep 4	3	1	1.32%
Cégep 5	0	1	1.32%
Cégep 6	4		
Cégep 7	6	3	3.95%
Cégep 8	2	1	1.32%
Cégep 9	10		
Cégep 10	6	1	1.32%
Cégep 11	2		
Cégep 12	9		
Cégep 13	1		
Cégep 14	6	3	3.95%
Cégep 15	2		
Cégep 16	1		
Cégep 17	4	2	2.63%
Cégep 18	2	1	1.32%
Cégep 19	3		
Cégep 20	1		
Cégep 21	2	2	2.63%
Cégep 22	8	1	1.32%
Cégep 23	15	3	3.95%
Cégep 24	2		
Cégep 25	5	4	5.26%
Cégep 26	0	1	1.32%
Cégep 27	3	4	5.26%
Cégep 28	15	3	3.95%
Cégep 29	3	1	1.32%
Cégep 30	2	1	1.32%
Cégep 31	20	3	3.95%
Cégep 32	5	1	1.32%
Cégep 33	9		
Cégep 34	3		
Cégep 35	5	2	2.63%
Cégep 36	4	2	2.63%
Cégep 37	31	9	11.84%
Total	216	52	
French - Private Colleges			
Collège 1	1	1	1.32%
Collège 2	3		
Total	4	1	
English - Public Colleges			
Cegep 1	17	3	3.95%
Cegep 2	88	14	18.42%
Cegep 3	2	1	1.32%
Cegep 4	11	3	3.95%
Cegep 5	13	1	1.32%
Total	131	22	
English - Private Colleges			
College 1	6	1	1.32%
Total	6	1	

[1] Questionnaires were also mailed to the membership of our 2 student partner organizations AQEIPS and NEADS

Table 2.03

Descriptive Statistics: Students' Impairments

Variable	Whole Sample #	Whole Sample %	English Cegeps #	English Cegeps %	French Cegeps #	French Cegeps %
Students' Disabilities[1]						
Visual Impairment	21	28%	10	43%	11	21%
Totally Blind	6	8%	1	4%	5	9%
Low Vision	15	20%	9	39%	6	11%
Medical Impairments	4	5%	2	9%	2	4%
Psychiatric Impairments	1	1%	0	0%	1	2%
Other	6	8%	1	4%	5	9%
Learning Disability	13	17%	6	26%	7	13%
Mobility Impairment &/Or Wheelchair User	31	41%	7	30%	24	45%
Wheelchair User	23	31%	5	22%	18	34%
Mobility Impairment	8	11%	2	9%	6	11%
Problems Using Arms Or Hands	20	27%	6	26%	14	26%
Hearing Impairment	21	28%	2	9%	19	36%
Deaf	8	11%	0	0%	8	15%
Hearing Impaired	13	17%	2	9%	11	21%
Speech Impairment	9	12%	0	0%	9	17%
Number of Different Impairments per Student						
1 Impairment	41	55%	14	64%	27	51%
2 Impairments	18	24%	5	23%	13	25%
3 Impairments	15	20%	2	9%	13	25%
4 Impairments	2	3%	1	5%	1	2%
5 Impairments or More	0	0%	0	0%	0	0%

Note. 23 students attended English cegeps and 53 attended French cegeps. 1 student from an English cegep did not answer this question.

Of the 6 students with a learning disability at an English cegep, 4 have only a learning disability while 1 student also has problems with hands and arms and the other has low vision. Of the 7 students at French cegeps, only 2 have only a learning disasilibty; 4 also have a hearing impairment (2 have a speech impairment has well) and 1 is also blind.

[1] Many students had more than 1 impairment. The mean number of impairments is 1.71 (based on N=76).

Table 2.04

Duration Of Students Disabilities/Impairments

Duration Of Impairment	Visual Impairment		Hearing Impairment		Speech Impairment	Learning Disability	Neuromuscular Impairment			Medical Or Psychiatric Impairments		
	Totally Blind	Low Vision	Deaf	Hearing Impaired			Wheelchair User	Mobility Impairment	Difficulty Using Arms Or Hands	Medical Impairment	Psychiatric Impairment	Other Disability
Since Childhood (Age <10)	80%	73%	88%	100%	78%	69%	36%	75%	50%	75%	0%	80%
In Between	0%	20%	13%	0%	22%	31%	64%	25%	30%	0%	100%	0%
Acquired Recently (Past 5 Years)	20%	7%	0%	0%	0%	0%	0%	0%	20%	25%	0%	20%

Table 2.05

Number And Modality Of Questionnaires Sent To Personnel Responsible For Providing Services To Students With Disabilities

Language	# Of Institutions[1]	Total Questionnaires Sent	Regular Print	Large Print	Audiotape	Braille	IBM Diskette	Macintosh Diskette
Total								
Total	43	357	275	32	11	14	22	3
Average / Institution		8.30	6.40	0.74	0.26	0.33	0.51	0.07
Percentage Of Total Sent			77%	9%	3%	4%	6%	1%
Minimum		1	0	0	0	0	0	0
Maximum		88	75	5	4	7	4	2
Standard Deviation		13.86	12.12	1.26	0.76	1.13	1.01	0.34
Median		4	3	0	0	0	0	0
English								
Total	6	137	108	9	5	1	11	3
Average / Institution		22.83	18.00	1.50	0.83	0.17	1.83	0.50
Percentage Of Total Sent		38%	30%	3%	1%	0%	3%	1%
Minimum		2	0	0	0	0	0	0
Maximum		88	75	4	2	1	4	2
Standard Deviation		32.36	28.23	1.52	0.98	0.41	1.60	0.84
Median		12	8	2	1	0	2	0
French								
Total	37	220	167	23	6	13	11	0
Average / Institution		5.95	4.51	0.62	0.16	0.35	0.30	0.00
Percentage Of Total Sent		62%	47%	6%	2%	4%	3%	0%
Minimum		1	0	0	0	0	0	0
Maximum		31	30	5	4	7	3	0
Standard Deviation		6.14	5.87	1.19	0.69	1.21	0.70	0.00
Median		4	2	0	0	0	0	0

[1] This represents 42 different institutions, as we sent materials to 2 autonomous campuses of Cégep de l'Outaouais.

Table 2.06

Characteristics Of Institutions From Which Questionnaires Were Received

Language of Cegep	# Of Questionnaires Received	AQEHPS Data # Of Institutions	Student Enrollment	# Of Students With Disabilities	% Of Students With Disabilities	"Official" Data # Of Institutions[1]	Student Enrollment[1]	# Of Students With Disabilities	% Of Students With Disabilities
Total									
Total	76	30				28			
Average / Institution	3		3,384	14	0.32%		3,556	8	0.17%
Minimum	1		256	0	0.00%		750	0	0.00%
Maximum	14		7,308	150	2.05%		7,308	54	0.64%
Standard Deviation	3		2,126	29	0.40%		2,088	12.00	0.17%
Median	2		3,177	5	0.21%		3,644	4	0.13%
English Cegeps									
Total	23	6				5			
Average / Institution	4		3,873	42	0.79%		4,308	17	0.32%
Minimum	1		832	1	0.12%		832	2	0.20%
Maximum	14		7,308	150	2.05%		7,308	54	0.64%
Standard Deviation	5		1,558	56	0.73%		2,660	21	0.18%
Median	3		3,233	33	0.67%		5,247	10	0.24%
French Cegeps									
Total	53	24				23			
Average / Institution	2		3,262	7	0.20%		3,392	6	0.14%
Minimum	1		256	0	0.00%		750	0	0.00%
Maximum	9		6,604	50	0.76%		6,604	35	0.58%
Standard Deviation	2		2,050	11	0.17%		1,991	893	0.15%
Median	2		3,116	4	0.13%		3,538	3	0.10%

[1] Based on AQEHPS data but excluding the 2 "non-official" private colleges

Table 2.07

Characteristics Of English Institutions and French Institutions from the Cities and the Regions from which Student Responses were Received

Variable	English Cegeps City	French Cegeps City	French Cegeps Regions
AQEHPS Data			
Student Enrollment[†]			
Mean	3873	4666	2259
Standard Deviation	(2558)	(2040)	(1397)
Number of Cegeps	6	10	14
# Of Students With Disabilities			
Mean	41.83	14.20	2.64
Standard Deviation	(55.59)	(14.65)	(1.98)
% Of Students With Disabilities			
Mean	.79%	.30%	.13%
Standard Deviation	(.0067)	(.0022)	(.0083)
"Official" Data			
Number of Cegeps	5	9	14
# Of Students With Disabilities			
Mean	17.20	12.22	1.93
Standard Deviation	(20.87)	(11.85)	(1.98)
% Of Students With Disabilities			
Mean	.32%	.23%	0.08%
Standard Deviation	(.0018)	(.0020)	(.0071)

Note. AQEIPS data are based on a survey conducted in 1998 by AQEHPS (1999). Official data are based on 1999 figures provided by the Service d'Aide à l'Intégration Des Élèves (SAIDE) at Cegep Vieux Montréal (Senécal, 2000) and by Le Services aux étudiants handicapés du Cégep de Sainte-Foy (Juhel, 2000); Marianopolis College and Petit Séminaire de Québec are excluded from these. Percentages do not equal scores obtained because of rounding errors.

[†] When the 2 "non-official" cegeps are deleted, the mean enrollment at the remaining 5 English cegeps is 4308 (SD=2600) and the mean enrollment for the remaining 9 French City cegeps is 5156 (SD = 1407).

Table 2.08

Computer And Internet Use by Students Enrolled in French And English Cegeps

	Computer Users		Non-Users		Internet Use	
	#	%	#	%	% of Sample Who Use The Internet	% of Sample Who Do Not Use The Internet
Whole Sample	71	93%	5	7%	84%	16%
English Cegeps	23	100%	0	0%	83%	17%
French Cegeps	48	91%	5	9%	85%	15%

Note. Chi Square tests show no significant differences in the proportion of students who use a computer in English and French cegeps The same is true for internet use

Table 2.09

Linguistic Differences In Attitudes, Views And Practices Toward Computer Use

Variable	Language Spoken More Often	Mean[1]	Std Deviation	t	df	Significance p=
Frequency, comfort and expertise						
In general, I rarely use computer technologies	Anglophone	1.95	1.91	-0.25	74	0.800
	Francophone	2.05	1.42			
In general, I consider my level of expertise with computer technologies to be very good	Anglophone	5.00	1.45	3.49	74	0.001
	Francophone	3.58	1.63			
I can comfortably use computer technologies if I need to	Anglophone	5.43	0.60	2.21	73	0.030
	Francophone	4.63	1.61			
Time during a typical school week spent (computer users only)						
Using a computer - not including time spent on the internet (number of hours per week)	Anglophone	10.62	7.72	0.85	67	0.398
	Francophone	8.59	9.63			
Using the internet (number of hours per week)	Anglophone	7.02	9.88	0.72	67	0.477
	Francophone	5.43	7.88			
Experiences, beliefs, values, and self evaluation						
Computer technologies that meet my needs are unavailable to me	Anglophone	3.00	1.84	2.00	72	0.049
	Francophone	2.13	1.59			
I am a person who dislikes computers	Anglophone	1.57	1.03	-1.01	74	0.314
	Francophone	1.93	1.48			
There are opportunities for me to learn how to use computer technologies	Anglophone	5.00	1.30	1.57	74	0.121
	Francophone	4.38	1.62			
Computer technologies are inadequate in meeting my needs effectively	Anglophone	3.00	1.61	1.19	73	0.239
	Francophone	2.46	1.81			
I do not plan to become more knowledgeable about computers	Anglophone	1.19	0.68	-1.94	74	0.056
	Francophone	1.78	1.33			
When I have problems with my computer technologies, I can get help easily	Anglophone	4.29	1.65	0.45	74	0.651
	Francophone	4.09	1.68			
Computers crash often	Anglophone	3.76	1.61	1.09	73	0.280
	Francophone	3.28	1.77			
Computer technologies I need cost too much	Anglophone	4.43	1.69	-0.13	73	0.899
	Francophone	4.48	1.59			
I think working efficiently on computers is unimportant	Anglophone	1.16	0.37	-1.87	70	0.065
	Francophone	1.77	1.41			
Using computer technologies effectively is likely to help me get my work done more easily	Anglophone	5.67	0.91	0.42	73	0.673
	Francophone	5.56	1.06			
In general, there are good computer facilities for me to use	Anglophone	4.67	1.28	0.30	73	0.768
	Francophone	4.56	1.53			
There are people available to show me how to use computer technologies	Anglophone	4.86	1.15	3.07	73	0.003
	Francophone	3.59	1.74			
My friends think I should use computer technologies	Anglophone	5.05	1.02	2.31	69	0.024
	Francophone	4.14	1.67			
Overall, I am very dissatisfied with my experiences with computers	Anglophone	2.75	1.65	1.17	71	0.246
	Francophone	2.26	1.56			

Note. Anglophone n= 21. Francophone n=55. A significance level of $p< .003$ is needed after a Bonferroni correction to the alpha level.

[1] Responses were made on a 6-point Likert scale with, 1 = strongly disagree and 6 = strongly agree

BEST COPY AVAILABLE

Table 2.10

Computer And Internet Use by Francophone Students in Cegeps Located in a City or in the Regions

	Computer Users		Non-Users		Internet Use	
	#	%	#	%	% of Sample Who Use The Internet	% of Sample Who Do Not Use The Internet
Whole Sample	50	91%	5	9%	84%	16%
Regions	21	81%	5	19%	78%	22%
City	29	94%	0	0%	86%	14%

Note. Chi Square tests show that City students are more likely to be computer users than Regions students, $x^2=[1,(n=55)]=6.14$, $p<.05$. The proportion of participants who use the internet in Cities and in the Regions did not differ significantly.

Table 2.11

Geographic Differences In Attitudes, Views And Practices Toward Computer Use: Francophone Students

Variable	Locale	Mean[1]	Std Deviation	t	df	Significance p=
Frequency, comfort and expertise						
In general, I rarely use computer technologies	Regions	2.23	1.56	0.87	53	0.388
	City	1.90	1.29			
In general, I consider my level of expertise with computer technologies to be very good	Regions	3.85	1.74	1.14	53	0.258
	City	3.34	1.52			
I can comfortably use computer technologies if I need to	Regions	4.58	1.63	-0.23	52	0.819
	City	4.68	1.61			
Time: Time during a typical school week spent (computer users only)						
Using a computer - not including time spent on the internet (number of hours per week)	Regions	8.21	7.31	-0.22	46	0.826
	City	8.84	11.00			
Using the internet (number of hours per week)	Regions	5.89	6.81	0.3297	46	0.743
	City	5.12	8.61			
Experiences, beliefs, values, and self evaluation						
Computer technologies that meet my needs are unavailable to me	Regions	2.00	1.44	-0.57	52	0.569
	City	2.25	1.73			
I am a person who dislikes computers	Regions	2.08	1.62	0.71	53	0.482
	City	1.79	1.35			
There are opportunities for me to learn how to use computer technologies	Regions	3.81	1.86	-2.63	53	0.011
	City	4.90	1.18			
Computer technologies are inadequate in meeting my needs effectively	Regions	1.88	1.34	-2.36	52	0.022
	City	3.00	2.04			
I do not plan to become more knowledgeable about computers	Regions	1.42	0.86	-1.94	53	0.057
	City	2.10	1.59			
When I have problems with my computer technologies, I can get help easily	Regions	4.50	1.50	1.74	53	0.087
	City	3.72	1.77			
Computers crash often	Regions	3.28	1.70	0.01	52	0.993
	City	3.28	1.87			
Computer technologies I need cost too much	Regions	4.69	1.67	0.94	52	0.352
	City	4.29	1.51			
I think working efficiently on computers is unimportant	Regions	1.65	1.20	-0.60	51	0.549
	City	1.89	1.60			
Using computer technologies effectively is likely to help me get my work done more easily	Regions	5.62	1.10	0.40	52	0.693
	City	5.50	1.04			
In general, there are good computer facilities for me to use	Regions	4.62	1.47	0.28	52	0.784
	City	4.50	1.60			
There are people available to show me how to use computer technologies	Regions	3.62	1.77	0.09	52	0.927
	City	3.57	1.75			
My friends think I should use computer technologies	Regions	4.46	1.61	1.31	48	0.197
	City	3.85	1.69			
Overall, I am very dissatisfied with my experiences with computers	Regions	2.12	1.42	-0.68	51	0.501
	City	2.41	1.69			

[1] Responses were made on a 6-point Likert scale with, 1 = strongly disagree and 6 = strongly agree

Note. City = Montréal, Quebec, and Hull, n=28. Regions = at least 1 hour travel from one of these urban centers, n=26. Note. A significance level of $p< .003$ is needed after a Bonferroni correction to the alpha level

Table 2.12

Computer And Internet Use by Male and Female Students

	Computer Users		Non-Users		Internet Use	
	#	%	#	%	% of Sample Who Use The Internet	% of Sample Who Do Not Use The Internet
Whole Sample	71	93%	5	7%	84%	16%
Females	37	93%	3	8%	85%	15%
Males	34	94%	2	6%	83%	17%

Note. Chi Square tests show no significant differences in the proportion of male and female students who use a computer. The same is true for internet use.

Table 2.13

Sex Differences in Attitudes, Views And Practices Toward Computer Use

Variable		Mean[1]	Std Deviation	t	df	Significance p=
Frequency, comfort and expertise						
In general, I rarely use computer technologies	Female	2.33	1.70	1.79	74	0.078
	Male	1.69	1.33			
In general, I consider my level of expertise with computer technologies to be very good	Female	3.55	1.55	-2.36	74	$\boxed{0.021}$
	Male	4.44	1.75			
I can comfortably use computer technologies if I need to	Female	5.08	1.24	1.41	73	0.163
	Male	4.61	1.61			
Time during a typical school week spent (computer users only)						
Using a computer - not including time spent on the internet (number of hours per week)	Female	7.73	7.69	-1.47	67	0.147
	Male	10.92	10.33			
Using the internet (number of hours per week)	Female	4.59	7.70	-1.40	67	0.167
	Male	7.44	9.22			
Experiences, beliefs, values, and self evaluation						
Computer technologies that meet my needs are unavailable to me	Female	2.35	1.73	-0.08	72	0.935
	Male	2.38	1.67			
I am a person who dislikes computers	Female	1.80	1.18	-0.19	74	0.848
	Male	1.86	1.57			
There are opportunities for me to learn how to use computer technologies	Female	4.53	1.41	-0.16	74	0.871
	Male	4.58	1.71			
Computer technologies are inadequate in meeting my needs effectively	Female	2.56	1.71	-0.25	73	0.803
	Male	2.67	1.84			
I do not plan to become more knowledgeable about computers	Female	1.75	1.26	1.00	74	0.321
	Male	1.47	1.16			
When I have problems with my computer technologies, I can get help easily	Female	4.25	1.56	0.58	74	0.564
	Male	4.03	1.78			
Computers crash often	Female	3.41	1.65	-0.02	73	0.987
	Male	3.42	1.84			
Computer technologies I need cost too much	Female	4.28	1.75	-1.04	73	0.303
	Male	4.67	1.43			
I think working efficiently on computers is unimportant	Female	1.65	1.34	0.26	70	0.796
	Male	1.57	1.17			
Using computer technologies effectively is likely to help me get my work done more easily	Female	5.69	0.77	0.94	73	0.351
	Male	5.47	1.23			
In general, there are good computer facilities for me to use	Female	4.72	1.34	0.81	73	0.419
	Male	4.44	1.58			
There are people available to show me how to use computer technologies	Female	4.18	1.57	1.25	73	0.217
	Male	3.69	1.80			
My friends think I should use computer technologies	Female	4.17	1.52	-1.34	69	0.186
	Male	4.66	1.57			
Overall, I am very dissatisfied with my experiences with computers	Female	2.28	1.43	-0.66	71	0.510
	Male	2.53	1.76			

Note. A significance level of $p < .003$ is needed after a Bonferroni correction to the alpha level. Female n=40, Male n=36.

[1] Responses were made on a 6-point Likert scale with: 1 = strongly disagree and 6 = strongly agree.

BEST COPY AVAILABLE

Table 2.14

Age And Experiences Of Computer User Students

Variable	Correlation with Age
Experiences	
In general, I rarely use computer technologies	-0.003
In general, I consider my level of expertise with computer technologies to be very good	-0.113
Computer technologies that meet my needs are unavailable to me	0.050
Getting my work done more easily is important to me	0.135
I am a person who dislikes computers	0.303*
There are opportunities for me to learn how to use computer technologies	-0.117
Computer technologies are inadequate in meeting my needs effectively (e.g., too inaccurate or slow)	-0.077
I do not plan to become more knowledgeable about computers	-0.023
What friends think about computers is unimportant to me	-0.030
When I have problems with my computer technologies, I can get help easily	-0.010
Computers crash often	-0.116
Computer technologies I need cost too much	0.167
I think working efficiently on computers is unimportant	-0.124
Using computer technologies effectively is likely to help me get my work done more easily	-0.181
Friends don't think using computers is helpful	-0.226
In general, there are good computer facilities for me to use	-0.110
I can comfortably use computer technologies if I need to	-0.095
There are people available to show me how to use computer technologies	-0.096
My friends think I should use computer technologies	0.224
In general, my financial situation allows me to meet my needs	-0.046
Overall, I am very dissatisfied with my experiences with computers	0.149
Time during a typical school week spent (computer users only)	
Using a computer - not including time spent on the internet (number of hours per week)	0.085
Using the internet (number of hours per week)	-0.182
Computer technologies cause problems for me because	
They are difficult to learn	0.234
They cost too much to buy	0.157
Using them causes me physical discomfort	0.183
They are frustrating / difficult to use	0.190
They crash	0.024
They need to be repaired often	0.313*
There are hardware and software compatibility problems (e.g., Document saved on one computer does not work on another)	0.193
They are inadequate in meeting my needs	0.017
They have to be upgraded continuously	0.094
They make me dependent on them	0.278*
Computer labs where my courses are held lack suitable adaptations for me (e.g., No dictation software)	0.319*
Manufacturers fail to support their products	0.137
There are few opportunities for training on adaptive technologies	0.234

* $p < .05$ or better

BEST COPY AVAILABLE

Table 2.15

Computer Technologies That Are/Could Be Useful: Whole Sample

Whole Sample (N=72)	Rank
A spell checker / grammar checker	1
A scanner	2
A portable note taking device	3
Dictation software (voice recognition software that types what you say)	4
Having material available in electronic format (e.g., books, hand-outs)	5
A large screen monitor	6
Other specialized software for learning disabilities (e.g., word prediction)	7
Voice control software (you give voice commands like "file," "open," - e.g., VoicePad)	8
A screen reader (software that reads what's on the screen)	9
Software that enlarges what is on the screen	10
Mouse adaptations (e.g., head mouse, track ball)	11
Keyboard adaptations (e.g., "sticky keys")	12
A Braille printer	13
Braille translation software	14

Note. Many students have more than 1 impairment.

Table 2.16

Computer Technologies That Are/Could Be Useful: Students with Hearing and Speech Impairments

Group	Adaptation	Rank
Deaf (N=8)		
	A scanner	1
	A spell checker / grammar checker	2
	A portable note taking device	3
	A screen reader (software that reads what's on the screen)	4
	Having material available in electronic format (e.g., books, hand-outs)	5
	A large screen monitor	6
	Other specialized software for learning disabilities (e.g., word prediction)	6
	Dictation software (voice recognition software that types what you say)	6
	Software that enlarges what is on the screen	7
	A Braille printer	8
	Keyboard adaptations (e.g., "sticky keys")	8
	Voice control software (you give voice commands like "file," "open," - e.g., VoicePad)	9
	Mouse adaptations (e.g., head mouse, track ball)	10
	Braille translation software	11
Hearing Impaired (N=11)		
	A spell checker / grammar checker	1
	A scanner	2
	A portable note taking device (not referring to a laptop)	3
	Dictation software (voice recognition software that types what you say)	4
	Having material available in electronic format (e.g., books, hand-outs)	5
	Other specialized software for learning disabilities (e.g., word prediction)	6
	Keyboard adaptations (e.g., "sticky keys")	7
	A screen reader (software that reads what's on the screen)	8
	Mouse adaptations (e.g., head mouse, track ball)	8
	Voice control software (you give voice commands like "file," "open," - e.g., VoicePad)	9
	Software that enlarges what is on the screen	10
	A Braille printer	11
	A large screen monitor	12
	Braille translation software	13
Speech / Communication Impaired (N=9)		
	A spell checker / grammar checker	1
	A scanner	2
	A portable note taking device (not referring to a laptop)	3
	Having material available in electronic format (e.g., books, hand-outs)	4
	Dictation software (voice recognition software that types what you say)	5
	A screen reader (software that reads what's on the screen)	6
	Other specialized software for learning disabilities (e.g., word prediction)	6
	Keyboard adaptations (e.g., "sticky keys")	6
	A large screen monitor	7
	Voice control software (you give voice commands like "file," "open," - e.g., VoicePad)	8
	Software that enlarges what is on the screen	9
	Mouse adaptations (e.g., head mouse, track ball)	10
	A Braille printer	11
	Braille translation software	12

Note. Many students have more than 1 impairment.

Table 2.17

Computer Technologies That Are/Could Be Useful: Students with Learning Disabilities, Medical Impairments, Psychological and Other Disabilities

Group	Adaptation	Rank
Learning Disability (n=13)		
	A spell checker / grammar checker	1
	Dictation software (voice recognition software that types what you say)	2
	A portable note taking device	3
	Other specialized software for learning disabilities (e.g., word prediction)	4
	A scanner	5
	A screen reader (software that reads what's on the screen)	6
	Having material available in electronic format (e.g., books, hand-outs)	7
	Voice control software (you give voice commands like "file," "open," - e.g., VoicePad)	8
	Mouse adaptations (e.g., head mouse, track ball)	9
	Keyboard adaptations (e.g., "sticky keys")	10
	Software that enlarges what is on the screen	11
	A Braille printer	12
	A large screen monitor	13
	Braille translation software	14
Medical Impairment (N=4)		
	A portable note taking device	1
	Dictation software (voice recognition software that types what you say)	1
	Having material available in electronic format (e.g., books, hand-outs)	2
	Voice control software (you give voice commands like "file," "open," - e.g., VoicePad)	3
	A scanner	4
	A spell checker / grammar checker	5
	Mouse adaptations (e.g., head mouse, track ball)	6
	Keyboard adaptations (e.g., "sticky keys")	6
	A large screen monitor	7
	Other specialized software for learning disabilities (e.g., word prediction)	7
	A screen reader (software that reads what's on the screen)	7
	Software that enlarges what is on the screen	7
	Braille translation software	7
	A Braille printer	7
Psychiatric and Other Disabilities (N=7)		
	A scanner	1
	A spell checker / grammar checker	2
	A portable note taking device	3
	Dictation software (voice recognition software that types what you say)	3
	Keyboard adaptations (e.g., "sticky keys")	4
	Having material available in electronic format (e.g., books, hand-outs)	5
	A large screen monitor	6
	Voice control software (you give voice commands like "file," "open," - e.g., VoicePad)	7
	Mouse adaptations (e.g., head mouse, track ball)	8
	Other specialized software for learning disabilities (e.g., word prediction)	9
	A screen reader (software that reads what's on the screen)	10
	Software that enlarges what is on the screen	11
	A Braille printer	12
	Braille translation software	13

Note. Many students have more than 1 impairment.

BEST COPY AVAILABLE

Table 2.18

Computer Technologies That Are/Could Be Useful: Students with Neuromuscular Impairments

Group	Adaptation	Rank
Wheelchair User (N=23)		
	A spell checker / grammar checker	1
	A scanner	2
	Dictation software (voice recognition software that types what you say)	3
	A portable note taking device	4
	Voice control software (you give voice commands like "file," "open," - e.g., VoicePad)	5
	Having material available in electronic format (e.g., books, hand-outs)	6
	A large screen monitor	7
	Mouse adaptations (e.g., head mouse, track ball)	8
	Keyboard adaptations (e.g., "sticky keys")	9
	A screen reader (software that reads what's on the screen)	10
	Other specialized software for learning disabilities (e.g., word prediction)	11
	Software that enlarges what is on the screen	12
	A Braille printer	13
	Braille translation software	14
Mobility Impairment (N=8)		
	A spell checker / grammar checker	1
	A portable note taking device	2
	Having material available in electronic format (e.g., books, hand-outs)	3
	A scanner	4
	Voice control software (you give voice commands like "file," "open," - e.g., VoicePad)	4
	A large screen monitor	4
	Dictation software (voice recognition software that types what you say)	5
	A screen reader (software that reads what's on the screen)	6
	Other specialized software for learning disabilities (e.g., word prediction)	7
	Software that enlarges what is on the screen	8
	Keyboard adaptations (e.g., "sticky keys")	9
	Mouse adaptations (e.g., head mouse, track ball)	10
	A Braille printer	11
	Braille translation software	12
Difficulty Using Arms or Hands (N=20)		
	A spell checker / grammar checker	1
	A portable note taking device	2
	Dictation software (voice recognition software that types what you say)	3
	A scanner	4
	Voice control software (you give voice commands like "file," "open," - e.g., VoicePad)	5
	Having material available in electronic format (e.g., books, hand-outs)	6
	Mouse adaptations (e.g., head mouse, track ball)	7
	Keyboard adaptations (e.g., "sticky keys")	8
	A large screen monitor	9
	Other specialized software for learning disabilities (e.g., word prediction)	10
	A screen reader (software that reads what's on the screen)	11
	Software that enlarges what is on the screen	12
	Braille translation software	13
	A Braille printer	13

Note. Many students have more than 1 impairment.

Table 2.19

Computer Technologies That Are/Could Be Useful: Students with Visual Impairments

Group	Adaptation	Rank
Totally Blind (N=6)		
	A spell checker / grammar checker	1
	A portable note taking device (not referring to a laptop)	1
	Dictation software (voice recognition software that types what you say)	2
	A screen reader (software that reads what's on the screen)	2
	Voice control software (you give voice commands like "file," "open," - e.g., VoicePad)	3
	Having material available in electronic format (e.g., books, hand-outs)	4
	Braille translation software	5
	A Braille printer	5
	Mouse adaptations (e.g., head mouse, track ball)	6
	A scanner	7
	Software that enlarges what is on the screen	7
	A large screen monitor	7
	Keyboard adaptations (e.g., "sticky keys")	8
	Other specialized software for learning disabilities (e.g., word prediction)	9
Low Vision (N=15)		
	Software that enlarges what is on the screen	1
	A large screen monitor	2
	A spell checker / grammar checker	3
	Having material available in electronic format (e.g., books, hand-outs)	4
	A portable note taking device	5
	Dictation software (voice recognition software that types what you say)	6
	A scanner	7
	Keyboard adaptations (e.g., "sticky keys")	8
	A screen reader (software that reads what's on the screen)	9
	Voice control software (you give voice commands like "file," "open," - e.g., VoicePad)	10
	Other specialized software for learning disabilities (e.g., word prediction)	11
	Braille translation software	12
	A Braille printer	12
	Mouse adaptations (e.g., head mouse, track ball)	12

Note. Many students have more than 1 impairment.

Table 2.20

Reasons Why The 5 Computer User Students Who Need Adaptations Are Not Using These

Reasons	Rank
It is unavailable to me	1
I am not interested in using it	1
Available computers don't have appropriate adaptive hardware/software on them	2
I don't know how to use it	3
It is too expensive to maintain	4
The technology makes me anxious	4
It costs too much	5
I am uncertain about where to buy it	5
It is too difficult to learn	6
Adaptive technology I need to use a computer works poorly for me	7
It is impossible for me to get it through a government program or an educational institution lending program	8

Note. 20 of the 71 (26%) computer user students indicated that they needed special adaptations to use a computer. 5 of them (25%) indicated that they did not use these.

Table 2.21

Computer, Information And Adaptive Technologies Used And Desired At Home And At School

Variable	Home		School	
	% Who Use This	% Of Those Who Don't Use This But Wish They Did	% Who Use This	% Of Those Who Don't Use This But Wish They Did
Desktop Computer	83%	67%	90%	57%
Laptop Computer	21%	40%	22%	27%
Adaptive Computer Hardware (e.g., Braille display) [1]	37%	42%	33%	17%
Adaptive Software (e.g., software that enlarges what is on the screen) [1]	42%	64%	37%	25%
Internet	67%	83%	77%	38%

Note. Data refer to students who indicated that they used a computer: 97% of computer user students indicated using a computer at home and 99% at school. 90% of computer user students use the internet.

[1] Refers to those who use computers and need adaptations to use computers effectively.

Table 2.22

Computer User Students: What Computers They Use And Where They Use Them

Variable	Whole Sample (n=71)	Sex: Females (n=37)	Sex: Males (n=33)	Geography and Language: English Cegep - City (n=23)	Geography and Language: French Cegep - City (n=26)	Geography and Language: French Cegep - Regions (n=21)
What Types Of Computers Students Use[1]						
IBM compatible	86%	81%	91%	91%	81%	86%
Macintosh	24%	32%	15%	22%	35%	14%
Other type of computer	10%	11%	9%	9%	8%	14%
Students Have Used Computers In The Following Locations						
At home	97%	97%	97%	100%	92%	100%
In a mainstream computer lab	82%	84%	80%	86%	83%	76%
During class lectures (e.g., writing lecture notes, in-class assignments)	62%	64%	59%	43%	69%	71%
In the library (e.g., doing assignments on a computer located in the library)	58%	62%	53%	77%	52%	71%
In a disabled student services office / specialized lab	31%	32%	29%	68%	19%	5%
At work	27%	24%	30%	27%	29%	24%

Note. 71 students use a computer. Boxed items denote major discrepancies.

Table 2.23

Computer, Information And Adaptive Technologies Used At School

Type Of Equipment Used	Language of Institution		French Cegeps		Sex	
	English	French	City	Regions	Females	Males
A desktop computer	100%	85%	86%	85%	92%	88%
A laptop computer	33%	16%	26%	8%	24%	19%
Adaptive computer hardware (e.g., Braille display)	24%	9%	10%	8%	11%	16%
Adaptive software (e.g., software that enlarges what is on the screen)	32%	6%	5%	8%	16%	13%
The internet	73%	78%	86%	72%	78%	75%

Note. Data refer to those 71 students who indicated that they used a computer.

Table 2.24

How Much Time Students Spend Using Computers During A Typical School Week

Variable	Mean	Std. Deviation	Range	
			Minimum	Maximum
Whole Sample				
Time spent using a computer exclusive of the internet (hr.)	9.21	9.08	1	48
Female	7.73	7.69	1	40
Male	10.92	10.33	2	48
Time spent using the internet (hr.)	5.91	8.49	<1	42
Female	4.59	7.70	<1	40
Male	7.44	9.22	<1	42
English Cegeps - City				
Time spent using a computer exclusive of the internet (hr.)	10.62	7.72	1	25
Time spent using the internet (hr.)	7.02	9.88	<1	42
French Cegeps - City				
Time spent using a computer exclusive of the internet (hr.)	8.84	11.00	1	48
Time spent using the internet (hr.)	5.12	8.61	<1	40
French Cegeps - Regions				
Time spent using a computer exclusive of the internet (hr.)	8.21	7.31	<1	35
Time spent using the internet (hr.)	5.89	6.81	<1	25

Note. Refers to computer users only. English cegeps n=23, French cegeps in Cities n=27, French cegeps in the Regions n=21. t-tests indicate no significant differences between Males and Females, between English and French City cegeps, or between French City and Regions cegeps on either computer use or internet use.

Table 2.25

Uses Of The Internet

Purpose	Rank
Doing research	1
E-mailing friends/family	2
Entertainment	3
Participating in chat rooms	4
Getting software / updates / demos	5
Accessing library materials	6
Looking for a job	7
E-mailing my professors	8
Participating in listservs/news groups	9
Banking/shopping	10
Taking courses on-line	11

Note. Refers to those 64 students who use the internet.

Table 2.26

Why Computer Users Do Not Use The Internet

Reasons	Rank
I have no access to a computer that is equipped to go on-line	1
It costs too much	2
The available browser / e-mail program (e.g., Netscape, Eudora) does not work well for me	2
It ties up the phone line	3
Some features of web sites are inaccessible to me	3
I am not interested in using it	4
It is unavailable in my area	5
It is not available at school	6

Note. 7 computer user students indicated that they did not use the internet.

Table 2.27

Problems With Computers Noted By Computer User Students

Problems	Rank
All Computer Users	
They cost too much to buy	1
They have to be upgraded continuously	2
There are hardware and software compatibility problems	3
They crash	4
There are few opportunities for training on adaptive technologies	5
They are frustrating / difficult to use	6
They make me dependent on them	7
Manufacturers fail to support their products	8
Computer labs where my courses are held lack suitable adaptations for me	9
They need to be repaired often	10
They are difficult to learn	11
They are inadequate in meeting my needs	12
Using them causes me physical discomfort	13
Computer Users Who Need Adaptations to Use Computers Effectively	
They cost too much to buy	1
They have to be upgraded continuously	2
There are hardware and software compatibility problems	3
They crash	4
Computer labs where my courses are held lack suitable adaptations for me	5
There are few opportunities for training on adaptive technologies	6
Manufacturers fail to support their products	7
They are inadequate in meeting my needs	8
They make me dependent on them	9
They are frustrating / difficult to use	10
They are difficult to learn	11
They need to be repaired often	12
Using them causes me physical discomfort	13

Table 2.28

Linguistic Differences In Problems Experienced Using Computers

Problems	Language Spoken More Often	Mean[1]	Std Deviation	t	df	Significance p=
They are difficult to learn	Anglophone	2.59	1.62	1.22	62	0.227
	Francophone	2.09	1.40			
They cost too much to buy	Anglophone	4.83	1.62	0.64	66	0.524
	Francophone	4.54	1.68			
Using them causes me physical discomfort	Anglophone	1.93	1.49	0.19	56	0.849
	Francophone	1.84	1.49			
They are frustrating / difficult to use	Anglophone	2.69	1.74	0.14	62	0.885
	Francophone	2.63	1.41			
They crash	Anglophone	3.56	1.72	0.87	64	0.386
	Francophone	3.15	1.69			
They need to be repaired often	Anglophone	2.75	1.65	0.95	60	0.345
	Francophone	2.33	1.49			
There are hardware and software compatibility problems	Anglophone	3.72	1.64	1.22	62	0.227
	Francophone	3.17	1.61			
They are inadequate in meeting my needs	Anglophone	2.24	1.48	0.33	58	0.742
	Francophone	2.09	1.51			
They have to be upgraded continuously	Anglophone	4.19	1.47	1.76	62	0.083
	Francophone	3.27	1.90			
They make me dependent on them	Anglophone	2.71	1.90	-0.26	59	0.797
	Francophone	2.84	1.80			
Computer labs where my courses are held lack suitable adaptations for me	Anglophone	2.71	2.09	-0.65	49	0.517
	Francophone	3.14	2.04			
Manufacturers fail to support their products	Anglophone	2.60	1.80	-0.96	55	0.339
	Francophone	3.12	1.78			
There are few opportunities for training on adaptive technologies	Anglophone	3.31	2.06	-0.08	53	0.935
	Francophone	3.36	1.87			

Note. Computer users only. Anglophone n=17, Francophone n=47.

[1] Responses were made on a 6-point Likert scale with 1 = strongly disagree and 6 = strongly agree

Table 2.29

Geographic Differences In Problems Experienced Using Computers by Francophone Computer Users

Problems	Locale	Mean[1]	Std Deviation	t	df	Significance p=
They are difficult to learn	Regions	2.10	1.29	0.14	43	0.887
	City	2.04	1.49			
They cost too much to buy	Regions	4.70	1.58	0.85	46	0.400
	City	4.28	1.79			
Using them causes me physical discomfort	Regions	1.60	1.05	-0.95	40	0.347
	City	2.05	1.84			
They are frustrating / difficult to use	Regions	2.67	1.35	0.16	44	0.875
	City	2.60	1.47			
They crash	Regions	3.24	1.76	0.08	44	0.940
	City	3.20	1.66			
They need to be repaired often	Regions	2.15	1.42	-0.95	42	0.345
	City	2.58	1.56			
There are hardware and software compatibility problems	Regions	3.10	1.61	-0.71	42	0.482
	City	3.43	1.56			
They are inadequate in meeting my needs	Regions	2.17	1.42	0.07	39	0.941
	City	2.13	1.63			
They have to be upgraded continuously	Regions	3.10	1.73	-0.91	44	0.370
	City	3.60	2.00			
They make me dependent on them	Regions	2.90	1.55	-0.10	40	0.923
	City	2.95	2.03			
Computer labs where my courses are held lack suitable adaptations for me	Regions	3.00	1.84	-0.15	34	0.878
	City	3.11	2.21			
Manufacturers fail to support their products	Regions	3.35	1.73	0.70	38	0.487
	City	2.95	1.88			
There are few opportunities for training on adaptive technologies	Regions	3.50	1.92	0.26	39	0.798
	City	3.35	1.85			

Note. Computer users only. Regions n=23; Cities n=25.

[1] Responses were made on a 6-point Likert scale with 1 = strongly disagree and 6 = strongly agree.

Table 2.30

Problems Using Computers At School Noted By Computer User Students

Problems	Rank
All Computer Users	
I have received insufficient training on existing adaptive technology	1
Computer labs/adaptive center have always been full	2
My schedule and the hours of access to computers have been incompatible	3
Using computer technologies in class makes me stand out	4
There has been a lack of suitable adaptive technology for my disability	5
There has been insufficient technical support available to me	6
The computer programs I use at home are unavailable at my educational institution	7
Using computer technology in class is disruptive (e.g., too noisy)	8
Computer Users Who Need Adaptations to Use Computers Effectively	
I have received insufficient training on existing adaptive technology	1
There has been a lack of suitable adaptive technology for my disability	2
There has been insufficient technical support available to me	3
Using computer technologies in class makes me stand out	4
Computer labs/adaptive center have always been full	5
My schedule and the hours of access to computers have been incompatible	6
The computer programs I use at home are unavailable at my educational institution	7
Using computer technology in class is disruptive (e.g., too noisy)	8

Table 2.31

Differences In Problems Using Computers at School Experienced by Computer Users at French and English Cegeps

Problems	Cegep	Mean[1]	Std. Deviation	t	df	Significance p=
Using computer technology in class is disruptive (e.g., too noisy)	English	3.64	2.29	2.04	41	0.048
	French	2.25	1.81			
My schedule and the hours of access to computers have been incompatible	English	2.44	1.67	-1.00	54	0.323
	French	3.00	1.99			
The computer programs I use at home are unavailable at my educational institution	English	1.89	1.45	-1.52	56	0.135
	French	2.65	1.89			
There has been insufficient technical support available to me	English	2.18	1.59	-1.11	53	0.271
	French	2.79	2.00			
Using computer technologies in class makes me stand out	English	3.23	2.05	-0.19	45	0.854
	French	3.35	2.01			
Computer labs/adaptive center have always been full	English	3.24	1.64	-0.14	49	0.887
	French	3.32	2.25			
There has been a lack of suitable adaptive technology for my disability	English	3.22	1.96	0.90	51	0.374
	French	2.71	1.95			
I have received insufficient training on existing adaptive technology	English	3.40	1.96	0.30	50	0.765
	French	3.22	2.02			

Note. Computer users only. English cegeps n= 18, French cegeps n=40. A significance level of p< .006 is needed after a Bonferroni correction to the alpha level.

[1] Responses were made on a 6-point Likert scale with 1 = strongly disagree and 6 = strongly agree

BEST COPY AVAILABLE

Table 2.32

Geographic Differences In Problems Using Computers at School Experienced by Computer Users at French Cegeps

Problems	Locale	Mean[1]	Std Deviation	t	df	Significance p=
Using computer technology in class is disruptive (e.g., too noisy)	Regions	2.83	2.04	1.63	32	0.114
	Cities	1.81	1.56			
My schedule and the hours of access to computers have been incompatible	Regions	3.85	1.90	2.36	40	0.023
	Cities	2.45	1.92			
The computer programs i use at home are unavailable at my educational institution	Regions	2.81	1.91	0.61	39	0.545
	Cities	2.45	1.85			
There has been insufficient technical support available to me	Regions	3.16	1.83	0.85	38	0.399
	Cities	2.62	2.13			
Using computer technologies in class makes me stand out	Regions	3.53	1.84	0.40	34	0.692
	Cities	3.26	2.13			
Computer labs/adaptive center have always been full	Regions	4.31	2.32	1.89	33	0.068
	Cities	2.86	2.10			
There has been a lack of suitable adaptive technology for my disability	Regions	3.00	1.97	0.85	34	0.402
	Cities	2.45	1.90			
I have received insufficient training on existing adaptive technology	Regions	3.88	2.00	1.88	36	0.068
	Cities	2.68	1.89			

Note. Computer users only. Regions n= 21, Cities n=22. A significance level of p<.006 is needed after a Bonferroni correction to the alpha level.

[1] Responses were made on a 6-point Likert scale with 1 = strongly disagree and 6 = strongly agree.

Table 2.33

How Students With Computer And/Or Adaptive Computer Technologies At Home Acquired These

Variable	Whole Sample	Students From English Cegeps	Students From French Cegeps
From my family who bought it for me	48%	53%	47%
By buying it myself	27%	37%	23%
Through the provincial government	19%	11%	23%
Through my educational institution's lending program	11%	5%	14%
Through a foundation/organization (e.g., Kiwanis Club, Neil Squire Foundation)	8%	5%	9%
By borrowing it from my family/friends	8%	11%	7%
Through the federal government	3%	5%	2%
Other	4%	9%	2%

Note. 97% of the computer user students indicated that they had a computer at home: 100% of students from English cegeps and 96% from French cegeps. A Chi Square test indicates that this difference is not significant. Percentages refer to percent of students who have a computer at home. Some students noted several sources of funding.

Table 2 34

Experiences Of Computer Users Who Took Advantage Of A Government Program

Experiences With A Government Program	Rank
All Students Who took Advantage of A Government Program	
The waiting period was very long	1
The equipment I received was up-to-date	2
The equipment I received met my needs	3
The program was flexible in meeting my needs	4
There were many restrictive rules and regulations	5
Contacting the necessary people to discuss my needs was easy	6
The process for applying was complicated	7
I received excellent training on the technology	8
I had no say in what hardware/software I received	9
The evaluation process was unpleasant	10
The program's documentation was unavailable in a format I could read myself (e g , no large print or tape)	11
Anglophone Students	
The waiting period was very long	1
The process for applying was complicated	2
Contacting the necessary people to discuss my needs was easy	3
The equipment I received was up-to-date	4
I had no say in what hardware/software I received	5
The equipment I received met my needs	6
There were many restrictive rules and regulations	7
The program was flexible in meeting my needs	8
The evaluation process was unpleasant	9
The program's documentation was unavailable in a format I could read myself (e g , no large print or tape)	10
I received excellent training on the technology	11
Francophone Students	
The equipment I received was up-to-date	1
The equipment I received met my needs	2
The waiting period was very long	3
The program was flexible in meeting my needs	4
There were many restrictive rules and regulations	5
Contacting the necessary people to discuss my needs was easy	6
I received excellent training on the technology	7
The process for applying was complicated	8
The evaluation process was unpleasant	9
I had no say in what hardware/software I received	10
The program's documentation was unavailable in a format I could read myself (e g , no large print or tape)	11
Students Who Need Adaptations To Use A computer Effectively Who Took Advantage of A Government Program	
The equipment I received was up-to-date	1
The waiting period was very long	2
The equipment I received met my needs	3
The program was flexible in meeting my needs	4
Contacting the necessary people to discuss my needs was easy	5
I received excellent training on the technology	6
There were many restrictive rules and regulations	7
The process for applying was complicated	8
The evaluation process was unpleasant	9
The program's documentation was unavailable in a format I could read myself (e g , no large print or tape)	10
I had no say in what hardware/software I received	11

Note Of the 69 students who used a computer at home and responded to this question, 20 indicated that they had taken advantage of a program [7 of 21 (33%) Anglophone and 13 of 48 Francophone (27%) students] 11 of them needed adaptations to use a computer effectively

Table 2.35

Linguistic Differences In Reasons Why Students Did Not Take Advantage Of A Government Program To Obtain A Computer Or Adaptive Computer Technologies

Reasons	Language Spoken More Often	Mean[1]	Std Deviation	t	df	Significance p=
I was unaware that there were any programs out there for me	Anglophone	4.69	1.44	0.13	37	0.898
	Francophone	4.62	1.90			
I / my family preferred to buy the equipment I needed	Anglophone	3.64	2.54	0.72	31	0.475
	Francophone	3.05	2.03			
My own /my family's income was too high for me to qualify	Anglophone	3.43	2.51	0.07	27	0.945
	Francophone	3.36	2.01			
The process for applying was too complicated	Anglophone	3.89	2.26	1.13	25	0.268
	Francophone	2.89	2.11			
My disability was excluded by existing programs	Anglophone	2.83	2.04	-0.68	25	0.502
	Francophone	3.52	2.23			
There were too many restrictions	Anglophone	4.14	2.27	0.95	22	0.353
	Francophone	3.24	2.08			
The waiting period was too long	Anglophone	3.63	1.77	1.26	22	0.220
	Francophone	2.63	1.86			
I did not want to take the required evaluation	Anglophone	2.00	2.24	-1.09	19	0.291
	Francophone	3.19	2.10			
The equipment I need was unavailable through existing programs	Anglophone	2.00	1.73	-0.67	21	0.510
	Francophone	2.72	2.22			

Table 2.36

What Kinds of Students Took Advantage of a Government Program: Computer Users Only

Students' Disabilities	# of Students Who Took Advantage of a Government Program	# of Students With the Impairment in Question [1]	% of Students Who Took Advantage of a Government Program
Visual Impairment	9	17	53%
Totally Blind	3	5	60%
Low Vision	6	12	50%
Medical Impairments	1	3	33%
Psychiatric Impairments	0	1	0%
Other	1	6	17%
Learning Disability	1	13	8%
Mobility Impairment &/Or Wheelchair User	11	31	35%
Wheelchair User	10	23	43%
Mobility Impairment	1	8	13%
Problems Using Arms Or Hands	10	20	50%
Hearing Impairment	0	20	0%
Deaf	0	8	0%
Hearing Impaired	0	12	0%
Speech Impairment	3	9	33%

Note. Overall, 20 students took advantage of a governement program. Several students had more than 1 impairment/disability.

[1] Refers only to students who responded to this question.

Table 2.37

Reasons Why Students Did Not Take Advantage Of A Government Program To Obtain A Computer Or Adaptive Computer Technologies

Sample	Reasons	Rank
All Students Who Did Not Take Advantage of A Government Program		
	I was unaware that there were any programs out there for me	1
	I / my family preferred to buy the equipment I needed	2
	My own /my family's income was too high for me to qualify	3
	The process for applying was too complicated	4
	My disability was excluded by existing programs	5
	There were too many restrictions	6
	The waiting period was too long	7
	I did not want to take the required evaluation	8
	The equipment I need was unavailable through existing programs	9
Anglophone Students		
	I was unaware that there were any programs out there for me	1
	I / my family preferred to buy the equipment I needed	2
	The process for applying was too complicated	3
	My own /my family's income was too high for me to qualify	4
	The waiting period was too long	5
	There were too many restrictions	6
	My disability was excluded by existing programs	7
	I did not want to take the required evaluation	8
	The equipment I need was unavailable through existing programs	9
Francophone Students		
	I was unaware that there were any programs out there for me	1
	My own /my family's income was too high for me to qualify	2
	I / my family preferred to buy the equipment I needed	3
	My disability was excluded by existing programs	4
	There were too many restrictions	5
	The process for applying was too complicated	6
	I did not want to take the required evaluation	7
	The equipment I need was unavailable through existing programs	8
	The waiting period was too long	9

Note. 49 of the 69 computer users who answered did not take advantage of a government program [14 of 21 (67%) Anglophone and 35 of 48 Francophone (73%) students].

Table 2.38

Why Students Do Not Use A Computer

Reasons	Rank
It is unavailable to me	1
It costs too much	2
Adaptive technology I need to access a computer works poorly for me	3
The technology makes me anxious	3
It is too expensive to maintain	4
I don't know how to use it	5
It is too difficult to learn	5
Available computers don't have appropriate adaptive hardware/software on them	6
I am uncertain about where to buy it	7
I am not interested in using it	7
It is impossible for me to get it through a government program or an educational institution lending program	8

Note. 5 students (7% of the sample) indicated that they did not use a computer.

Table 2.39

Suggestions For Adaptive Computer Hardware And Software Companies In Rank Order

Suggestion	Rank	% Of Students
Provide student discounts	1	87
Make adaptive hardware and software less expensive to purchase	2	78
Provide grants to educational institutions to purchase equipment	3	53
Provide trial periods	4	49
Ensure that advertising reaches students with disabilities	5	46
Make product more user friendly	6	45
Provide better technical support	7	43
Make manuals/tutorials easier to understand	8	37
Provide training	9	35
When designing a piece of hardware or software, include accessibility features for a variety of users with disabilitie	10	30
Make manuals/tutorials available in alternative formats	11	21

Note. Based on the responses of all 76 students.

Table 3.01

Demographics: Numbers Of Disability Service Provider Participants

Variable	Whole Sample		Anglophone	Francophone	Females	Males
Total Number Of Participants	46		6	40		
Females	22	48%	4	18		
Males	24	52%	2	22		
Location						
Cities	22	48%	5	1	10	12
Regions	24	52%	17	23	12	12
Years Of Experience Working With Students With Disabilities						
Mean	8.44		8.17	8.49	7.59	9.26
Standard Deviation	5.39		5.34	4.46	3.93	6.48
Range	<1-24		1-15	<1-24	1-15	<1-24
Median	8		9	8	8	7

Table 3.02

Cegeps Represented in the Sample

	Anglophone	Francophone	Total
Cegeps			
Total number	5	43	48
Number with students with disabilities	5	38	43
Participated (number)	4	33	37
"Return rate" (percent)	80%	87%	86%
Campuses/Sectors			
Total number	8	89	97
Number with students	8	77	85
Number with students with disabilities	8	50	58
Participated (number)	6	40	46
"Return rate" (percent)	75%	80%	79%

Table 3.03

Representation Of Students With Disabilities In The Cegeps: 3 Sources Of Information

	AQEHPS	"Official"	Participants	MEQ
Number of cegeps	36	37	37	37
Total enrollment				
Mean	3541	N/A	3530	3403
Standard deviation	1939	N/A	2273	1955
Range	750-7308	N/A	700-8500	750-7550
Number of students with disabilities				
Mean	13.56	7.11	22.49	N/A
Standard deviation	26.59	10.89	42.93	N/A
Range	0-150	0-54	0-200	N/A
Percentage of students with disabilities[1]				
Mean	0.30%	0.18%	0.57%	0.56%
Standard deviation	0.38%	0.19%	0.97%	0.92%
Range	0% - 2.05%	0% - .83%	0% - 5.71%	0% - 5.31%

[1] Percentages are not identical to values obtained by dividing due to rounding errors.

Table 3.04

Correlations Among The 3 Sources Of Information About The Representation Of Students With Disabilities In The Cegeps

			AQEHPS	"Official"	Participants
Number of students with disabilities					
	AQEHPS				
		Correlation	1	0.867	0.637
		Significance		0.000	0.000
		N	36	36	36
	"Official"				
		Correlation	0.867	1	0.688
		Significance	0.000		0.000
		N	36	37	37
	Participants				
		Correlation	0.637	0.688	1
		Significance	0.000	0.000	
		N	36	37	37
Percentage of students with disabilities					
	AQEHPS				
		Correlation	1	0.629	0.218
		Significance		0.000	0.201
		N	36	36	36
	"Official"				
		Correlation	0.629	1	0.453
		Significance	0.000		0.005
		N	36	36	37
	Participants				
		Correlation	0.218	0.453	1
		Significance	0.201	0.005	
		N	36	37	37
	MEQ	Correlation	0.301	0.471	0.994
		Significance	0.074	0.004	0.000
		N	36	36	36

Note. Pearson product-moment correlations. The correlations between total enrollment figures are as follows: AQEHPS and Participants r(34) = .947, p<.001; AQEHPS and MEQ r(34) = .980, p<.001; Participants and MEQ r(34) = .938, p<.001.

Table 3.05

Participants' Data: Differences Between French And English Cegeps

Variable	Cegep	N	Mean	Std. Deviation
All cegeps in the sample				
Total student enrollment	English	4	5975	1750
	French	33	3234	2165
Total number of students with disabilities	English	4	74	67
	French	33	16	35
% Students with disabilities[1]	English	4	1.09%	.70%
	French	33	.51%	.87%
[3]Controlling for learning disabilities in English cegeps				
Total number of students with disabilities	English	4	49	45
	French	33	16	35
% Students with disabilities[1]	English	4	.73%	.47%
	French	33	.51%	.87%
[2] With the 3 largest "centres d'accueil" cegeps removed				
Total student enrollment	English	3	5133	586
	French	31	3013	2035
Total number of students with disabilities	English	3	41	24
	French	31	14	35
% Students with disabilities[1]	English	3	.78%	.42%
	French	31	.49%	1.02%
Controlling for learning disabilities in english cegeps				
Total number of students with disabilities	English	3	28	16
	French	31	14	35
% Students with disabilities[1]	English	3	.53%	.29%
	French	31	.49%	1.02%

[1] Percentages are not identical to values obtained by dividing due to rounding errors.

[2] With the 3 largest "centre d'accueil" cegeps removed: 1 English (Dawson) and 2 French (Cégep de St-Foy and Cégep du Vieux Montréal)

[3] Learning disabilities may not be considered a disability in French cegeps. Therefore, the number of students with disabilities at English cegeps was reduced by 1/3, the approximate proportion of students with learning disabilities in most North American postsecondary educational institutions.

Table 3.06

AQEHPS Data: Differences Between French And English Cegeps

Variable	Cegep	N	Mean	Std. Deviation
All Cegeps in the Sample				
Total student enrollment	English	4	5648	1227
	French	32	3278	1852
Total number of students with disabilities	English	4	62	60
	French	32	8	11
% Students with disabilities[1]	English	4	.98%	.75%
	French	32	.21%	.20%
[3]Controlling for Learning Disabilities In English Cegeps				
Total number of students with disabilities	English	4	42	41
	French	32	8	11
% Students with disabilities[1]	English	4	.66%	.51%
	French	32	.21%	.20%
[2]With the 3 Largest "Centre d'Accueil" Cegeps Removed				
Total student enrollment	English	3	5094	648
	French	30	3086	1754
Total number of students with disabilities	English	3	32	16
	French	30	6	7
% Students with disabilities[1]	English	3	.62%	.28%
	French	30	.18%	.17%
Controlling for Learning Disabilities In English Cegeps				
Total number of students with disabilities	English	3	22	11
	French	30	6	7
% Students with disabilities[1]	English	3	.42%	.20%
	French	30	.19%	.17%

[1] Percentages are not identical to values obtained by dividing due to rounding errors.

[2] With the 3 largest "centre d'accueil" cegeps removed: 1 English (Dawson) and 2 French (Cégep de Ste. Foy and Cégep du Vieux Montréal)

[3] Learning disabilities may not be considered a disability in French cegeps. Therefore, the number of students with disabilities at English cegeps was reduced by 1/3, the approximate proportion of students with learning disabilities in most North American postsecondary educational institutions.

Table 3.07

"Official" Data: Differences Between French And English Cegeps

Variable	Cegep	N	Mean	Std. Deviation
All Cegeps in the Sample				
Total number of students with disabilities	English	4	21	22
	French	33	5	8
% Students with disabilities[1]	English	4	0.31%	0.22%
	French	33	0.16%	0.18%
[2]With the 3 Largest "Centre d'Accueil" Cegeps Removed				
Total number of students with disabilities	English	3	10	1
	French	31	4	4
% Students with disabilities[1]	English	3	0.20%	0.01%
	French	31	0.14%	0.16%

[1] Percentages are not identical to values obtained by dividing due to rounding errors. Percentages based on total enrollments reported by participants.

[2] With the 3 largest "centre d'accueil" cegeps removed: 1 English (Dawson) and 2 French (Cégep de St-Foy and Cégep du Vieux Montréal)

Table 3.08

Characteristics Of Participating English And French Cegeps From The Cities And The Regions: 3 Sources Of Information

Data Source	English Cegeps City		French Cegeps City	French Cegeps Regions	t-test French Cegeps Cities vs. Regions		
	Controlling for Learning Disabilities	Whole Sample			t	df	p
AQEHPS Data							
Student Enrollment							
Mean		5648	4417	2393	3.60	30	0.001
Standard Deviation		(1227)	(1659)	(1516)			
Number of Cegeps		4	14	18			
# Of Students With Disabilities							
Mean	41.21	61.50	12.50	3.72	2.53	30	0.042
Standard Deviation		(60.38)	(14.37)	(3.16)			
% Of Students With Disabilities							
Mean	.73%	98%	.25%	.18%	0.99	30	ns
Standard Deviation		(.0075)	(.0024)	(.0017)			
Participants' Data							
Student Enrollment							
Mean		5975	4642	2090	4.46	31	0.000
Standard Deviation		(1750)	(2217)	(1381)			
Number of Cegeps		4	14	19			
# Of Students With Disabilities							
Mean	49.24	73.50	28.64	7.00	1.80	31	0.082
Standard Deviation		(67.30)	(53.06)	(6.90)			
% Of Students With Disabilities							
Mean	82%	1.09%	66%	40%	0.78	31	ns
Standard Deviation		(.0070)	(.0148)	(.0037)			
"Official" Data							
Number of Cegeps		4	14	19			
# Of Students With Disabilities							
Mean	N/A	21.00	9.79	2.11	3.28	31	0.003
Standard Deviation		(22.02)	(10.33)	(2.42)			
% Of Students With Disabilities[1]							
Mean	N/A	.31%	20%	.13%	1.18	31	ns
Standard Deviation		(.0022)	(.0016)	(.0019)			

Note. AQEHPS data are based on a survey conducted in 1998 by AQEHPS (1999). "Official" data are based on 1999 figures provided by the Service d'Aide à l'Intégration Des Élèves (SAIDE) at Cegep Vieux Montréal (Senécal, 2000) and by Le Services aux étudiants handicapés du Cégep de Sainte-Foy (Juhel, 2000). Percentages do not equal scores obtained because of rounding errors.

[1] Based on division by the total enrollment reported by participants.

[2] Learning disabilities may not be considered a disability in French cegeps. Therefore, the number of students with disabilities at English cegeps was reduced by 1/3, the approximate proportion of students with learning disabilities in most North American postsecondary educational institutions.

Table 3.09

Institutions With And Without Computer And/Or Adaptive Computer Technologies On Campus For Students With Disabilities: Enrollment Characteristics

Data Source	Computers on Campus	N	Mean	SD	t	df	Sig.
Participants' Data							
Total student enrollment	Yes	34	3215	2348	0.80	43	0.429
	No	11	2573	2198			
Number of students with disabilities	Yes	34	21.91	43.86	1.18	43	0.243
	No	11	6.09	5.92			
Percentage of students with disabilities	Yes	34	0.61%	0.0100	1.05	43	0.301
	No	11	0.28%	0.0027			
"Official" Data							
Number of students with disabilities	Yes	33	8.45	12.34	1.33	42	0.189
	No	11	3.36	4.18			
Percentage of students with disabilities	Yes	34	0.22%	0.0023	0.83	43	0.409
	No	11	0.15%	0.0029			

Table 3.10

Comparison of Institutions Which Do and Do Not Have Computer Technologies on Campus for Students with Disabilities Actual Conditions

Variable	Computer on Campus	N	Mean	SD	t	df	Sig
Overall rating about how well students' computer related needs are met	Yes	32	4.16	1.53	0.605	35	0.549
	No	5	4.60	1.52			
Inside and outside the institution factors							
Funding							
Funding for institution's adaptive computer technologies	Yes	31	3.65	1.92	-0.49	39	0.625
	No	10	4.00	2.16			
Inside the institution factors							
Access to adaptive computer technologies							
Availability in mainstream computer labs	Yes	26	4.27	1.66	0.77	29	0.449
	No	5	3.60	2.41			
Internet/library and adaptive computer technologies							
Internet-based distance education accessible	Yes	15	3.07	1.87	1.87	16	$\boxed{0.080}$
	No	3	1.00	0.00			
Library's computers accessible	Yes	33	4.15	1.50	0.27	42	0.791
	No	11	4.00	2.00			
Support for adaptive computer technologies							
Computer support people can service adaptive technologies	Yes	31	3.48	1.88	0.51	38	0.612
	No	9	3.11	2.09			
Advisory/steering committee deals with computer accessibility	Yes	29	1.90	1.37	2.15	38	$\boxed{0.038}$
	No	11	1.00	0.00			
Specialist in adaptive computer technologies on campus	Yes	30	2.63	1.85	0.57	39	0.574
	No	11	2.27	1.68			
Consulted when computer infrastructure decisions made	Yes	32	2.63	1.98	1.59	41	0.120
	No	11	1.64	0.92			
Administration reacts positively concerning computer accessibility	Yes	31	4.94	1.26	1.44	38	0.158
	No	9	4.11	2.20			
Opportunities for employees to learn about adaptive technologies	Yes	28	3.00	1.85	2.11	37	$\boxed{0.042}$
	No	11	1.73	1.19			
Faculty and computer accessibility							
Computer-based teaching materials used by professors accessible	Yes	28	4.18	1.52	-0.97	34	0.340
	No	8	4.75	1.28			
Faculty trained in adaptive computer technologies	Yes	33	3.00	1.68	2.26	41	$\boxed{0.029}$
	No	10	1.70	1.25			
Personal factors							
Knowledgeable about adaptive computer technologies	Yes	33	3.36	1.58	2.78	42	$\boxed{0.008}$
	No	11	1.91	1.22			

Note. Boxed items denote items that are significant or approach significance.

Table 3.11

Adequacy of Meeting the Computer Related Needs Of Students with Disabilities: Correlations with Actual Conditions Inside the Institution

Existing Situation	r	Significance	Mean	SD
Inside and outside the institution factors				
Funding				
Funding for institution's adaptive computer technologies	0.370	$\boxed{0.034}$	3.73	1.96
Inside the institution factors				
Access to adaptive computer technologies				
Computer technologies up-to-date	0.723	$\boxed{0.000}$	4.03	1.53
Availability in specialized labs/centres	0.700	$\boxed{0.000}$	4.09	1.62
Availability in mainstream computer labs	0.687	$\boxed{0.000}$	4.16	1.77
Off-campus loan program	0.623	$\boxed{0.001}$	3.83	1.83
Training for students on adaptive computer technologies	0.525	$\boxed{0.012}$	3.18	2.02
Physical space available for computer technologies	0.463	$\boxed{0.013}$	4.17	1.65
Hours of access to computers	0.259	0.202	4.42	1.36
Internet/library & adaptive computer technologies				
Enough adapted computers with internet access	0.385	$\boxed{0.039}$	4.33	1.52
Internet-based distance education accessible	0.163	0.577	2.79	1.84
Libraries computers accessible	0.032	0.854	4.11	1.62
Support for adaptive computer technologies				
Technical support	0.457	$\boxed{0.015}$	3.71	1.76
Computer support people can service adaptive technologies	0.399	$\boxed{0.019}$	3.40	1.91
Advisory/steering committee deals with computer accessibility	0.386	$\boxed{0.027}$	1.65	1.23
Specialist in adaptive computer technologies on campus	0.352	$\boxed{0.045}$	2.54	1.79
Consulted when computer infrastructure decisions made	0.142	0.415	2.37	1.81
Administration reacts positively concerning computer accessibility	0.136	0.451	4.75	1.53
Opportunities for employees to learn about adaptive technologies	0.129	0.489	2.64	1.77
Faculty and computer accessibility				
Computer-based teaching materials used by professors accessible	0.470	$\boxed{0.008}$	4.31	1.47
Faculty trained in adaptive computer technologies	0.443	$\boxed{0.008}$	2.70	1.67
Personal factors				
Knowledgeable about adaptive computer technologies	0.280	$\boxed{0.099}$	3.00	1.61

Note. r values based on Ns ranging from 14 to 37. Boxed values denote items that are significant or approach significance

Table 3.12

Adequacy of Meeting the Needs Of Students: Correlations with Enrollment Statistics

Variable	Data Source		Pearson Product-Moment Correlation
Total Enrollment			
	Participants	Correlation	0.205
		Significance	0.223
		N	37
Number Of Students With Disabilities			
	"Official"	Correlation	0.062
		Significance	0.719
		N	36
	Participants	Correlation	-0.010
		Significance	0.955
		N	37
Percentage Of Students With Disabilities			
	"Official"	Correlation	-0.251
		Significance	0.135
		N	37
	Participants	Correlation	-0.085
		Significance	0.619
		N	37

Table 3.13

Meeting the Needs Of Students

Actual Situation	Mean	SD	N	Desired Situation (It Would Be Helpful If)	Mean	SD	N
Overall Rating About How Well Students' Computer Related Needs Are Met	4.22	1.51	37				
Inside and Outside The Institution Factors							
Funding							
Funding for institution's adaptive computer technologies	3.73	1.96	41	More funding for institution's adaptive computer technologies	4.44	1.58	41
Average	**3.73**			**Average**	**4.44**		
Inside The Institution Factors							
Access To Adaptive Computer Technologies							
Hours of access to computers	4.42	1.38	26				
Physical space available for computer technologies	4.17	1.65	29	More physical space for equipment	4.24	1.64	29
Availability in mainstream computer labs	4.16	1.77	31	Equipment available in more computer labs	3.92	1.80	39
Availability in specialized labs/centres	4.09	1.62	23	More equipment available in specialized labs/centres	4.16	1.62	25
Computer technologies up-to-date	4.03	1.53	32				
Off-campus loan program	3.83	1.83	24				
Training for students on adaptive computer technologies	3.18	2.02	22	A person to train students	4.33	1.82	27
Average	**3.98**			**Average**	**4.18**		
Internet/Library and Adaptive Computer Technologies							
Enough adapted computers with internet access	4.33	1.52	30				
Library's computers accessible	4.11	1.62	44				
Internet-based distance education accessible	2.79	1.84	19				
Average	**3.75**						
Support For Adaptive Computer Technologies							
Administration reacts positively concerning computer accessibility	4.75	1.53	40	If administration were to react more positively	3.61	1.84	36
Technical support	3.71	1.76	28				
Computer support people can service adaptive technologies	3.40	1.91	40	If computer support people took responsibility for adaptive technologies	4.76	1.38	37
Opportunities for employees to learn about adaptive technologies	2.64	1.77	39	Professional development time to learn about adaptive technologies	4.41	1.83	41
Specialist in adaptive computer technologies on campus	2.54	1.79	41	If there were a specialist in adaptive computer technologies on campus	4.76	1.39	41
Consulted when computer infrastructure decisions made	2.37	1.81	43	If consulted when computer infrastructure decisions made	4.21	1.75	43
Advisory/steering committee deals with computer accessibility	1.65	1.23	40	Have multidisciplinary advisory/steering committee	4.21	1.92	42
Average	**3.01**			**Average**	**4.33**		
Faculty And Computer Accessibility							
Computer-based teaching materials used by professors accessible	4.31	1.47	38	If computer-based teaching materials used by professors were more accessible	4.41	1.54	37
Faculty trained in adaptive computer technologies	2.70	1.67	43				
Average	**3.50**			**Average**	**4.41**		
Outside The Institution Factors							
Agencies provide students with appropriate equipment	4.77	1.16	44				
Agencies provide students with adequate training	3.93	1.49	42				
				If students were able to get subsidized technologies for home use more easily	5.31	0.90	42
				If students had adequate access to computers off campus	4.95	1.38	42
				If students were knowledgeable computer users	4.89	1.24	44
				If organizations that provide students with technologies were to work cooperatively	4.66	1.49	41
Average	**4.35**			**Average**	**4.83**		
Personal Factors							
Knowledgeable about adaptive computer technologies	3.00	1.61	44				
Average	**3.00**						

BEST COPY AVAILABLE

Table 3.14

Meeting the Needs Of Students: Similarities and Differences Between Actual And Desired Situations

Actual Situation	Actual Situation		Desired Situation		Desired Situation (It Would Be Helpful If ...)	Correlation Between Actual and Desired			Difference Between Actual and Desired		
	Mean	SD	Mean	SD		N	Correlation	Sig	t	df	Sig
Inside & Outside The Institution Factors											
Funding											
Funding for institution's adaptive computer technologies	3.74	1.93	4.36	1.58	More funding for institution's adaptive computer technologies	39	-0.297	$\boxed{0.066}$	-1.36	38	0.183
Inside The Institution Factors											
Access To Adaptive Computer Technologies											
Availability in specialized labs/centres	4.00	1.60	4.23	1.54	More equipment available in specialized labs/centres	22	0.019	0.932	-0.48	21	0.633
Physical space available for computer technologies	4.11	1.64	4.36	1.54	More physical space for equipment	28	-0.352	$\boxed{0.066}$	-0.51	27	0.618
Training for students on adaptive computer technologies	3.18	2.02	4.68	1.49	A person to train students	22	-0.360	$\boxed{0.100}$	-2.42	21	$\boxed{0.025}$
Availability in mainstream computer labs	4.13	1.80	3.87	1.85	Equipment available in more computer labs	30	-0.337	$\boxed{0.069}$	0.49	29	0.628
Support For Adaptive Computer Technologies											
Consulted when computer infrastructure decisions made	2.29	1.74	4.17	1.75	If consulted when computer infrastructure decisions made	42	0.104	0.513	-5.21	41	$\boxed{0.000}$
Opportunities for employees to learn about adaptive technologies	2.66	1.79	4.45	1.80	Professional development time to learn about adaptive technologies	38	0.049	0.771	-4.46	37	$\boxed{0.000}$
Advisory/steering committee deals with computer accessibility	1.65	1.23	4.25	1.88	Have multidisciplinary advisory/steering commitee for adaptive computer technologies	40	0.216	0.180	-8.18	39	$\boxed{0.000}$
Administration reacts positively concerning computer accessibility	4.71	1.45	3.57	1.85	If administration were to react more positively	35	-0.267	0.121	2.56	34	$\boxed{0.015}$
Computer support people can service adaptive technologies	3.26	1.86	4.68	1.41	If computer support people took responsibility for adaptive technologies	34	-0.428	$\boxed{0.012}$	-2.97	33	$\boxed{0.006}$
Specialist in adaptive computer technologies on campus	2.44	1.74	4.74	1.43	If there were a specialist in adaptive computer technologies on campus	39	-0.324	$\boxed{0.044}$	-5.57	38	$\boxed{0.000}$
Faculty And Computer Accessibility											
Computer-based teaching materials used by professors accessible	4.22	1.48	4.34	1.62	If computer-based teaching materials used by professors were more accessible	32	-0.262	0.147	-0.29	31	0.776

BEST COPY AVAILABLE

Table 3.15

Comparison of Responses of Participants Whose Actual Situations Do Vs. Do Not Meet The Computer Related Needs Of Students

Desired Situation	Existing Situation Meets The Needs Of Students	N	Mean	SD	t	df	Sig
Inside and Outside The Institution Factors							
Funding							
More funding for institution's adaptive computer technologies	Yes	23	3.83	1.67	-2.73	37	0.010
	No	16	5.13	1.09			
Inside The Institution Factors							
Access To Adaptive Computer Technologies							
More equipment available in specialized labs/centres	Yes	14	4.07	1.54	-0.62	20	0.543
	No	8	4.50	1.60			
More physical space for equipment	Yes	19	4.00	1.56	-1.86	26	0.075
	No	9	5.11	1.27			
A person to train students	Yes	11	4.27	1.56	-1.31	20	0.206
	No	11	5.09	1.38			
Equipment available in more computer labs	Yes	20	3.40	1.98	-2.06	28	0.049
	No	10	4.80	1.14			
Support For Adaptive Computer Technologies							
If consulted when computer infrastructure decisions made	Yes	9	4.44	1.59	0.53	40	0.598
	No	33	4.09	1.81			
Professional development time to learn about adaptive technologies	Yes	14	4.50	1.83	0.14	36	0.892
	No	24	4.42	1.82			
Have multidisciplinary advisory/steering committee for adaptive computer technologies [1]	Yes	3	5.75	0.50	N/A	N/A	N/A
	No	36	4.08	1.90			
If administration were to react more positively concerning accessibility of computers on campus [1]	Yes	30	3.40	1.79	N/A	N/A	N/A
	No	5	4.60	2.07			
If computer support people took responsibility for adaptive technologies	Yes	18	4.22	1.70	-2.09	32	0.044
	No	16	5.19	0.75			
If there were a specialist in adaptive computer technologies on campus	Yes	12	4.33	1.67	-1.20	37	0.236
	No	27	4.93	1.30			
Faculty And Computer Accessibility							
If computer-based teaching materials used by professors were more accessible	Yes	23	4.04	1.77	-1.73	30	0.094
	No	9	5.11	0.78			

[1] The sample size in one of the cells was too low to conduct a t-test

BEST COPY AVAILABLE

Table 3.16

Wish List Of Personnel Providing Services To Students With Disabilities In Rank Order

Desired Situtation (It Would Make My Job Easier If...)	Mean	SD	N	Rank
All Respondents				
If students were able to get subsidized computer technologies for home use more easily	5.31	0.90	42	1
If students had adequate access to computers off campus	4.95	1.38	42	2
If students were knowledgeable computer users	4.89	1.24	44	3
If computer support people took responsibility for adaptive technologies	4.76	1.38	37	4
If there were a specialist in adaptive computer technologies on campus	4.76	1.39	41	5
If organizations that provide students with technologies were to work cooperatively	4.66	1.49	41	6
More funding for institution's adaptive computer technologies	4.44	1.58	41	7
If computer-based teaching materials used by professors were more accessible	4.41	1.54	37	8
Professional development time to learn about adaptive technologies	4.41	1.83	41	9
A person to train students	4.33	1.82	27	10
More physical space for equipment	4.24	1.64	29	11
If consulted when computer infrastructure decisions made	4.21	1.75	43	12
Have multidisciplinary advisory/steering committee for adaptive computer technologies	4.21	1.92	42	13
More equipment available in specialized labs/centres	4.16	1.62	25	14
Equipment available in more computer labs	3.92	1.80	39	15
If administration were to react more positively concerning accessibility of computers on campus	3.61	1.84	36	16
Respondents Who Indicated That The Current Situation Did Not Meet The Needs Of Students with Disabilities [1]				
If students were able to get subsidized computer technologies for home use more easily	5.31	0.90	42	1
If computer support people took responsibility for adaptive technologies	5.19	0.75	16	2
More funding for institution's adaptive computer technologies	5.13	1.09	16	3
More physical space for equipment	5.11	1.27	9	4
If computer-based teaching materials used by professors were more accessible	5.11	0.78	9	5
A person to train students	5.09	1.38	11	6
If students had adequate access to computers off campus	4.95	1.38	42	7
If there were a specialist in adaptive computer technologies on campus	4.93	1.30	27	8
If students were knowledgeable computer users	4.89	1.24	44	9
Equipment available in more computer labs	4.80	1.14	10	10
If organizations that provide students with technologies were to work cooperatively	4.66	1.49	41	11
If administration were to react more positively concerning accessibility of computers on campus	4.60	2.07	5	12
More equipment available in specialized labs/centres	4.50	1.60	8	13
Professional development time to learn about adaptive technologies	4.42	1.82	24	14
If consulted when computer infrastructure decisions made	4.09	1.81	33	15
Have multidisciplinary advisory/steering committee for adaptive computer technologies	4.08	1.90	36	16

[1] Responses of those participants whose answers to the "paired" question was <=3 (i.e., below the mid point of the scale)

Code de diffusion 143025

322